

# SOUTHERN POWER AND INDUSTRY

**MAY, 1956**

SPI's 52nd Year

**TENTH ANNUAL  
PLANT MAINTENANCE  
ISSUE**

**TWENTY-ONE** Southern and Southwestern manufacturing, power and service plants report on plant-tested maintenance methods, procedures and techniques.

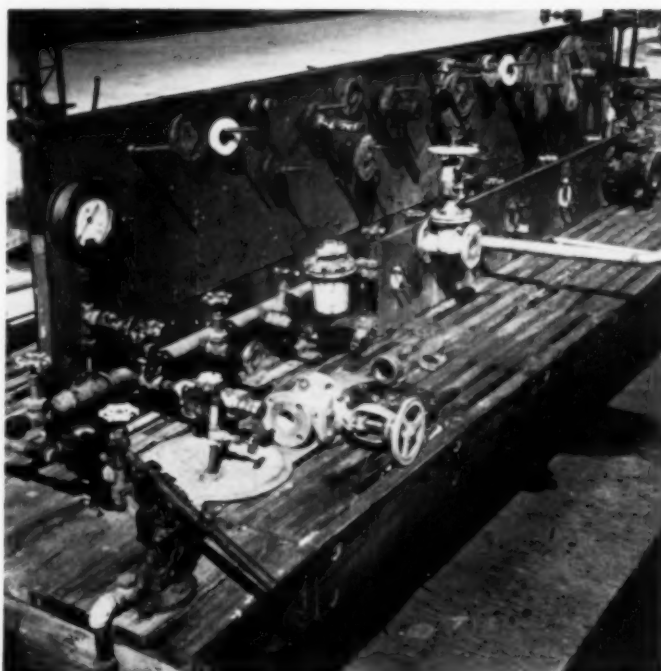
**Complete Contents on Page 3**



**FIFTY CENTS PER COPY**

## **TEST TABLE at CELANESE**

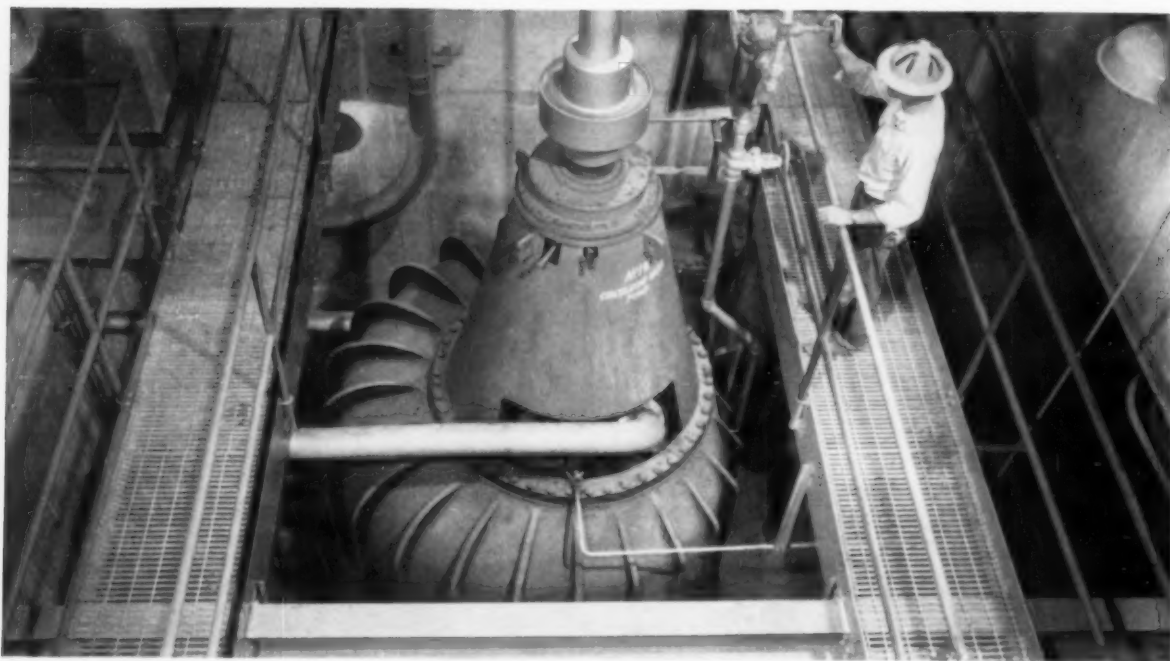
**Duplicates Working Conditions  
in Carolina Manufacturing Plant**



**IN ROCK HILL, S. C.,** Celanese plant maintenance personnel perform their own repair work and then check the job on a very convenient test table. Whether it be for steam, water, or air service—valves, traps, shop fabricated fittings, welded pipe joints, etc. are tested under the design pressures they are to serve. See page 55 for details.

Allis-Chalmers

## **PUMPS** Meet Power Plant Requirements



# **Heavy-Duty Construction Helps Assure Service Continuity**

At Clifty Creek Plant of the Indiana-Kentucky Electric Corporation, the use of 12 Allis-Chalmers vertical condenser circulating pumps for dry pit installation helps to assure service continuity and reduced maintenance.

Rigid whip-free shaft, protected oil-lubricated bearings, and special new-type rib construction that

makes casing stronger and saves space — these are some of the features that make A-C circulating pumps popular throughout the power industry.

**For the complete story** on how Allis-Chalmers pumps can help you cut costs, contact your local Allis-Chalmers district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

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Design and construction features like these assure dependable, day-after-day operation — better performance and low operating costs for you.

Benefit from Allis-Chalmers experience in building pumps for every industry. Industry-trained engineers are at your service to aid in selecting the right pump for your application. And, you can get the complete unit — pump, motor, control — from Allis-Chalmers.

# **ALLIS-CHALMERS**



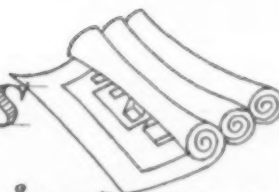
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Volume 74

Number 5

# *HOFFMAN'S ENGINEERED SYSTEMS designed to do the tough jobs in industry*



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# SOUTHERN POWER AND INDUSTRY

Vol. 74  
No. 5

MAY, 1956



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# *Facts and Trends*

## FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

May, 1956

- ◆ **MAINTENANCE TEST TABLE** at Celanese Corporation's Rock Hill, S. C., plant duplicates working conditions. Plant maintenance personnel perform their own repair work and then check the job on a very convenient test table. Whether it be for steam, water, or air service—valves, traps, shop fabricated fittings, welded pipe joints, etc., are tested under the design pressures they are to serve. See photo on cover.
- ◆ **THE "RAINBOW" COATING SYSTEM**—method of corrosion protection—is being used by Graver Water Conditioning Co., manufacturers of industrial and municipal waste water treatment equipment. The wide range of liquids and chemicals handled by such equipment often calls for special protection against corrosion to eliminate excessive maintenance and replacement.

Graver applies 5 to 7 coats of paint at installation time using successively different colors for each coat. As the protective coating wears off, the operator can tell at a glance, from the color showing, just how much wear has occurred, how much protection remains, and which parts or sections have received more wear than others. He knows exactly when recoating of all or part of the equipment is necessary.

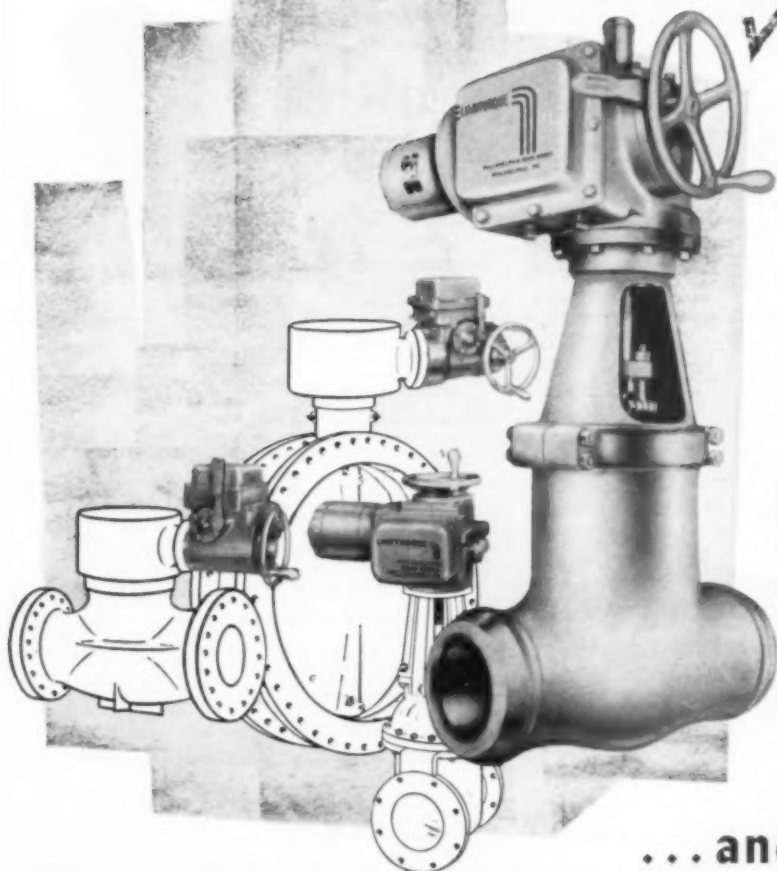
- ◆ **HYDRAULIC SLIDE RULE** that solves common water problems is being offered engineers by Peerless Pump. Head, capacity, horsepower and efficiency all appear on one setting. Saves time in sizing and selecting pumps for all pumping problems. For your free slide rule, send letterhead request (mentioning SP&I) to Peerless Pump Division, 2005 Northwestern Ave., Indianapolis 8, Indiana; or use service coupon on page 69, SP&I for April, 1956.
- ◆ **GOT LIGHTNING PROTECTION?** The menace of lightning is more severe in the part of the country where we live. Range of lightning storms is from less than 5 per year on the West Coast to as many as 94 in the vicinity of Tampa, Florida. Santa Fe, New Mexico, is second with 73. However, there is no fixed schedule. Havoc-raising disturbances can occur almost any time throughout the summer.

Practically all heavy duty smoke stacks are equipped with lightning protection systems because of the obvious hazard. Make sure that whatever system you have, or will employ, follows specifications as prescribed by the National Bureau of Standards, Factory Mutual Association, National Fire Protection Association, Factory Insurance Association, Underwriters Laboratories, etc.

- ◆ **"SYNDUCTION MOTOR"** design by Allis-Chalmers combines constant speed characteristics of synchronous machines with the mechanical construction of induction motors. Motors are available in ratings from 1/4 to 40 hp and require no brushes, slip rings or windings on the rotor, separate source of direct current excitation, or special starting equipment as is the case with standard synchronous motors.

Unit starts as an induction motor with a very high locked-rotor torque, accelerates and pulls into synchronism quickly, and runs

# Check these features



- Micrometer torque seating switch gives tight valve closure, and protects valve parts from damage.
- Self contained unit—no gears, stem nut or bearings to buy.
- Weatherproof, dust-tight and water-tight construction.
- Hammerblow device . . . allows motor to reach full speed, before load is engaged.
- Non-rotating handwheel built into the unit.
- Automatic declutching.
- Motor is disengaged during hand-wheel operation.
- Can always be declutched for hand-wheel operation regardless of weather or electrical conditions.
- High torque motors.
- Simple valve yoke.
- May be mounted in any position.
- Three to four times faster handwheel operation.
- Actuation may be by any available power source such as electricity, air, oil, gas, water or steam. LimiTorque is readily adapted for microwave control.
- LimiTorque is designed for plug, butterfly, gate and globe valves up to 96" diameter . . . Entire Unit and nut can be lifted off valve yoke, by removing flange bolts.

...and you'll understand why more **LIMITORQUE** valve controls are in use than all others combined

Send for new catalog L-550, and please use your Business Letterhead when requesting.

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Liquid and dry boiler feedwater treatments that prevent and remove scale in many types of water. Stop foaming and carry-over.

### **COOLEX**

Prevents scale and corrosion in condenser cooling water systems, air washers, chilled and hot-water circulating systems.

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Protects steam and condensate lines against corrosion caused by the breakdown of bicarbonates in the boiler.

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A liquid fuel oil treatment that dissolves and prevents sludge in storage tanks.

### **REMOX**

Prevents corrosion caused by oxygen. Eliminates need for oxygen tests.

### **KLEERFLO**

A water-clear liquid formula that prevents scale and corrosion in hot-water systems.

### **RUSTEX**

Prevents scale and corrosion in humidifying systems.

### **FREE ENGINEERING AND ANALYSIS SERVICE**

The Anderson Service Engineer in your area will be glad to study your particular water problems and make recommendations. He will have water samples analyzed in our laboratories shortly after beginning treatment and make any adjustments in the treatment that may be necessary. Similar analyses will continue at regular intervals. There is no charge for this valuable service.

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WATER BEHAVE**



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## Facts and trends (continued from page 4)

as a synchronous motor. Having a high (175 to 200%) pull-out torque, the motor remains in synchronism regardless of load or line voltage fluctuations.

- ◆ EVER USE A POGO STICK? It bounces evenly on the ground, but suddenly rebounds higher when it strikes a hard surface. The action of Ingersoll-Rand's new Torque Control Impactool is quite similar. This air operated tool will run a nut to any desired torque, then automatically shut itself off.

Design applies the torsion bar principle to torque control. While nut is being run to required torque, the Impactool operates at normal power and speed, but when required torque is reached and nut-running resistance is equal to the stress preset in the torsion bar, the impact mechanism rebounds instantly and trips a rubber-faced shutoff valve.

Advantages to the maintenance or production man include: simple torque setting, constant torque setting, accurate torque control, no need for pressure regulators, reversible operation, and low maintenance.

- ◆ CERAMIC TOOL BITS show promise of providing a faster means of removing metal. They are still experimental and none are available on the market at the present time. More field tests are necessary and types of clamp tool holders and tool geometry are still very much open questions. Considerable work is being done at the Rodman Laboratory, Watertown Arsenal.
- ◆ IDENTIFYING NEW EMPLOYEES by distinctive markings on their wearing apparel is now a recognized safety practice throughout industry. Plant safety directors and supervisors state that if an untrained newcomer can be made to stand out from old hands he can be better safeguarded from known hazards.

Mine Safety Appliance Company reports that several heavy industry plants require all new employees to wear specially painted white helmets during their first 30 days on the job. After a month they graduate to the same standard helmets worn by their fellow workers.

- ◆ OIL FOG PRINCIPLE in centralized lubrication—C. A. Norgren Company's new Micro-Fog control unit automatically creates a finely divided airborne oil fog, which can be uniformly distributed through complex piping systems to multiple lubrication points. Single unit can completely lubricate even the largest machines—up to 1000 bearing-inches. Compact, small units are only 12"x11"x9".
- ◆ LOWER MAINTENANCE COSTS—The following pages (both editorial and advertising) present many "plant-tested" procedures to reduce maintenance costs, save materials and improve operations.

It's SPI's 10th ANNUAL PLANT MAINTENANCE ISSUE. You and other engineers in manufacturing, power and large service plants throughout the South and Southwest set the pattern of this issue, reporting on proven maintenance procedures.

Few of you will find it profitable to study every article—but if you will spin the pages, and read the titles and subtitles, you are sure to find one, two—or a dozen ideas that will help you improve maintenance in your plant.

Write the editors for additional information on any of the above items.  
SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 8, Ga.

# NEWS for the South and Southwest

## A. M. Lockett Executives

George R. Hammett and Robert P. Lockett, Jr., have been elected vice-presidents of A. M. Lockett & Company, Ltd.

Mr. Hammett is a graduate of Tulane University, College of Engineering, Class of 1919, with a Bachelor of Engineering Degree in Mechanical and Electrical Engineering. He has been connected with A. M. Lockett & Company since his graduation, and has served in various Engineering capacities. Since July, 1944, Mr. Hammett has been Manager of the New Orleans District Office of the Company.

Mr. Lockett is a graduate of Tulane University, College of Engineering, Class of 1936, with a Bachelor of Engineering Degree in Mechanical and Electrical Engineering. With the exception of 3 years during the last world war, when he was a Senior Lieutenant in the United States Navy and served as Chief Engineer of the U.S.S. Charles J. Badger, DD659, a 2100 ton destroyer, Mr. Lockett has been connected with A. M. Lockett & Company, or affiliates of the Com-



George Hammett & Robert P. Lockett, Jr.

pany, for the past 20 years. Since 1948, Mr. Lockett has been Assistant Manager of the New Orleans District Office.

In addition to his capacity as Vice-President, Mr. Lockett will serve as Assistant to the President of the Company.

## Stephens-Adamson Mfg. Co. Opens Atlanta Warehouse

Stephens - Adamson Mfg. Co., Standard Products Division, has opened a regional warehouse at 650 Murphy Ave., S. W., Bldg. E, Unit

18, Atlanta, Georgia. The new warehouse will stock belt conveyor components, car loading machinery, winches, car pullers, transmission equipment and allied lines. It is the second such unit to be established by Stephens-Adamson in the last six months and is designed to serve distributors and territorial sales offices in the Southeast.

Al Steele is the territorial sales manager located in Atlanta, with Don Dolan holding a similar post in Raleigh, North Carolina.

## E. F. Houghton—Southeast

E. F. Houghton & Co., Philadelphia manufacturer of oils, chemicals and packings, has announced that Armand J. Andre, previously a representative in Houghton's Chicago Sales Division, has been appointed to the newly created position of Assistant Sales Manager of the Southern Division, with headquarters in Charlotte, N. C. Andre has been with Houghton since 1953.

## Shepherd Company Now Handling Ross Valves

Ross Operating Valve Co. has named the Allan T. Shepherd Co. of Richmond, Va., Greensboro, N. C., and Greenville, S. C., as representative in this three state area for the Ross valve line.

Adolphus B. Shepherd, a graduate engineer and son of the Shepherd firm's founder, Allan T. Shepherd, manages the company headquarters office in Richmond. He is assisted by Wayne Hagaman, an expert in the use of steam control, heat exchangers and other mechanical equipment installations.

The North Carolina operation is headed by Dewitt H. Skinner at the Greensboro branch office. Skinner combines an academic engineering background with design application experience.

The South Carolina sales and service operation is directed by W. Parke Terry at the Greenville branch office. Terry, also a graduate engineer, has received many years of mechanical application experience.

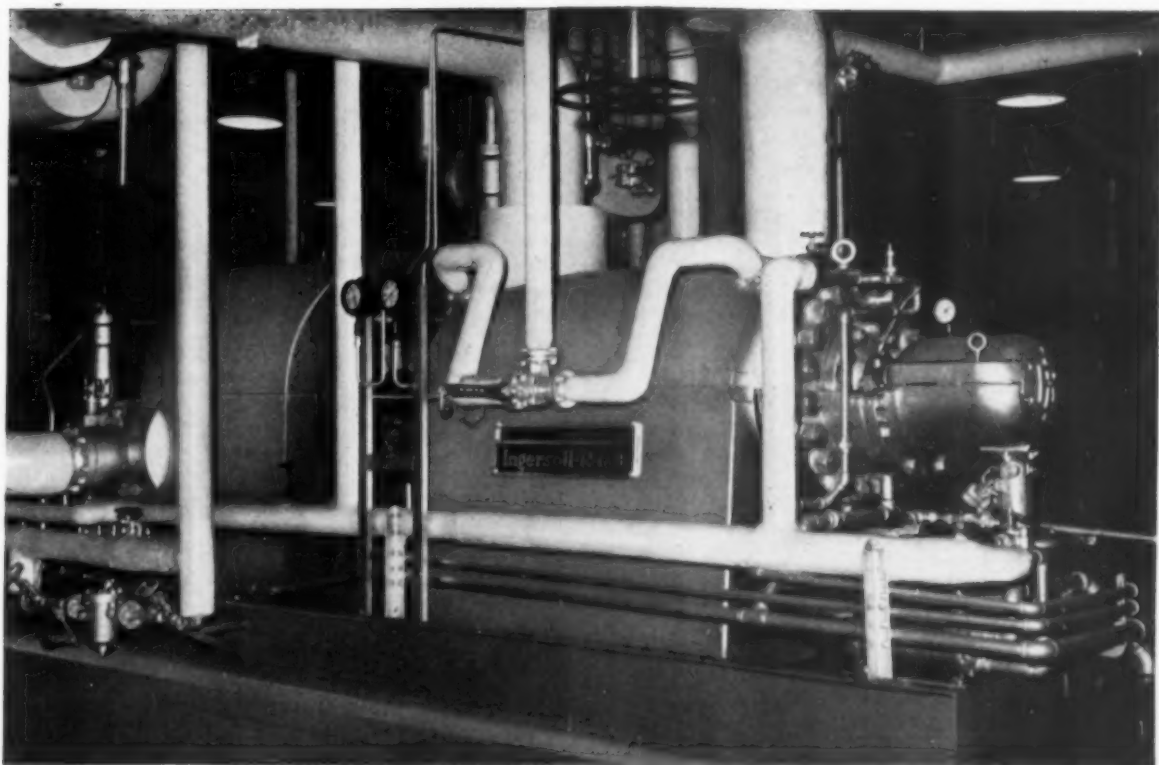
## International Industrial Exposition Lakewood Park, Atlanta, Ga., May 18-25

Atlanta, Georgia—"Market Place of the Great Southeast"—will be host on May 18-25th to the International Industrial Exposition. Exhibits will occupy two large buildings and a spacious outdoor plaza area at Lakewood Park.

Chairman of the Exhibition's Board is E. A. Yates, Jr., manager of the Industrial Division, Georgia Power Company. Roger E. Montgomery is Managing Director of the Exposition with headquarters at Lakewood Park, Box 1164, Atlanta 1, Ga. Admission will be by invitation only, with exhibitors issuing the invitations.

Of over 100 foreign and national exhibitors, a great many serve the manufacturing, utility and large service plants of the Southeast. These include: Dodge Corporation, Mishawaka, Indiana; Southeastern Machine Tool Co., Atlanta, Ga.; U. S. Hoffman Machinery Co., New York, N. Y.; Alsynite Co., San Diego, Cal.; Do-All South Atlantic Co., Atlanta, Ga.; Kennametal, Inc., Latrobe, Pa.; Westinghouse Electric, Pittsburgh, Pa.; Fafnir Bearings, New Britain, Conn.; General Electric, Schenectady, N. Y.; and Geo. D. Roper Corp., Rockford, Ill.

Other scheduled industrial exhibitors (as of April 3rd) include: Ideal Industries, Inc., Sycamore, Ill.; Fairbanks Company, New York City; Clark Equipment Co., Battle Creek, Mich.; Ames Iron Works, Oswego, N. Y.; Metallizing Co. of America, Chicago, Ill.; S. C. Johnson & Sons, Racine, Wisc., and R. L. Fulghum Co., Atlanta, Ga.



Great Northern Paper Co. gets

## PERFORMANCE PLUS ECONOMY

with New I-R Boiler-Feed Pumps

**A**t East Millinocket, Maine, the Great Northern Paper Company is completing a \$45,000,000 expansion program that will bring total mill capacity to 1,000 tons of newsprint per day. Constructed by Stone and Webster Engineering Corp., this mill represents the last word in modern paper-making methods and equipment.

In the new and completely modern power plant, boiler feedwater is handled by three identical Ingersoll-Rand 10-stage double-case pumps, each rated 757 gpm, 1554 psi discharge, 287°F. The cylindrical, double-case construction of these Class CHTA high-pressure pumps

simplifies maintenance, permits equalized thermal expansion of all internal parts and assures sustained high efficiency. This extra performance means long-range *economy* in heavy-duty service.

Other I-R Cameron pumps are also widely used throughout this ultra-modern mill. In fact you'll find the familiar I-R nameplate on more than 70 units in various plant and process services.

Whatever your liquid-moving requirements, there's an I-R pump that's *right* for the job. Any time you have a pumping problem, your Ingersoll-Rand representative will be glad to help you.

**Ingersoll-Rand** 

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PUMPS • COMPRESSORS • CONDENSERS • DIESEL ENGINES • VACUUM EQUIPMENT • AIR AND ELECTRIC TOOLS

## News for the South & Southwest (Continued)

### Thomas & Betts—Atlanta

Hugh Holcombe has been appointed Atlanta district manager for **The Thomas & Betts Co.**, manufacturer of electrical fittings.

Mr. Holcombe was formerly a sales representative for the company in the Atlanta area. In his new capacity, he will supervise Thomas & Betts sales activities in Georgia, the Carolinas and Alabama. He reports to C. A. Biddulph, Eastern division manager.

### Anderson Brass President Honored by Foremen's Club

The Alabama Council of the **National Association of Foremen** chose the occasion of their recent 4th Regional Conference in Birmingham to honor **Mr. R. E. Schuler**, President of **Anderson Brass Works, Inc.** of Birmingham.



NAF "Management Oscar" goes to **R. E. SCHULER**, President of **Anderson Brass**, Birmingham industrial leader. At left presenting the "Management Man of the Year" Award is **O. J. MARCUM**, of **Alabama Power Company** and President of the Alabama Council of NAF Clubs.

Since 1924 Mr. Schuler has devoted his entire energies in building **Anderson Brass** to a position of recognized leadership in the manufacture of electrical power connectors, clamps, fittings and accessories. The main plant in Birmingham now employs more than 450 people. A new aluminum foundry, one of the most modern in the Southeast, is under construction at Leeds, Alabama. The Company's products are marketed throughout the country, and in several foreign countries as well.

### Texas Eastman—Longview

The **Girdler Company**, Louisville, Ky., is designing a part of the new production facilities for the **Texas Eastman Company**, a division of the **Eastman Kodak Company**, at **Longview, Texas**. They will increase Texas Eastman's output of Tenite polyethylene plastic to 40 million pounds annually.

Girdler's contract includes engineering and procurement of equipment and materials. The new facilities are scheduled for completion later this year. Girdler is a division of the **National Cylinder Gas Company**, Chicago.

### FUTURE EVENTS of Engineering Interest

May 3-4; **National Association of Corrosion Engineers**, Southeastern Regional Meeting, Atlanta, Ga.

May 6-9; **American Institute of Chemical Engineers**, Roosevelt Hotel, New Orleans, La.

May 9-11; **Fourth Welding Show**, Memorial Auditorium, Buffalo, N. Y.; sponsored by **American Welding Society**, 33 West 39th St., New York 18, N. Y.

May 18-25; **Southeastern Industrial Exposition**, Lakewood Park, Atlanta, Ga.; **Roger E. Montgomery**, Managing Director, Lakewood Park, Atlanta, Ga.

June 5-8; **Material Handling Institute's Exposition of 1956**, Cleveland Public Auditorium, Cleveland, Ohio.

June 22; **Public Utilities Accident Prevention Conference**, Hotel Roanoke, Roanoke, Va.; sponsored by **Accident Prevention Committee**, **Public Utilities Association of the Virginias**; **Robert W. McKinnon**, Exec. Secty., 5 Franklin Rd., Roanoke, Va.

Sept. 14-15; **35th Annual Meeting**, **Public Utilities Association of the Virginias**, Greenbrier Hotel, White Sulphur Springs, W. Va. Estimated attendance 400.

Sept. 23-26; **Petroleum-Mechanical Engineering Conference**, A.S.M.E., Conrad Hilton Hotel, Dallas, Texas; **C. E. Davies**, Secty., A.S.M.E., 29 West Thirty-Ninth St., New York 18, N. Y.

Oct. 23-25; **Industrial Packaging and Materials Handling Engineers Exposition and Educational Short Course**, St. Louis, Mo.; **SIPMHE** headquarters at 20 West Jackson Blvd., Chicago 4, Ill.

Nov. 28-30; **National Power Show**, New York Coliseum, Columbus Circle, New York City, N. Y.; **E. K. Stevens**, Mgr., **National Exposition of Power and Mechanical Engineering**, 480 Lexington Ave., New York 17, N. Y.

### Western Precipitation Adds to Southern Sales Staff

To meet the steadily-growing demand for its dust and flyash recovery equipment in the industrial South, **Western Precipitation Corporation** announces the addition of **Gilbert G. Schneider** to its staff operating out of the Atlanta District Offices. In his new location, Schneider will assist **Kenneth C. Cree** as Sales Engineer in serving the states of **North and South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, Louisiana, Arkansas, Oklahoma and Texas**.



Schneider, a graduate in Chemical Engineering from **Rensselaer Polytechnic Institute**, joined the **Western Precipitation** organization as a Test Engineer where he gained extensive experience in the many technical aspects of modern **Cottrell Precipitator** design and operation. In 1952 he was transferred to sales engineering in the company's **Precipitator Division**, working out of the Los Angeles offices. Two years later he was assigned to sales activities in the New York District Offices, specializing in the company's **Cottrell Precipitator**, **CMP (Combination Multiclone-Precipitator)** and **Multiclone** installations.

### Bristol Co.—Alabama

The **Bristol Company**, Waterbury, Conn., has appointed two new district managers.

**L. B. Lumpkin** has been named manager of the company's **Pittsburgh** office, after having spent seven years as manager of the **Birmingham** office.

**W. C. Peterson** will be taking over the management of the **Birmingham** office. Mr. Peterson has spent ten years with **Bristol's** New York sales force. Previous to that, he was an instrument field service man, also in New York, for six years.

More News — Page 112





**TYPE 657A**

Double port globe body for conventional service. Also supplied single port where tight closure required. Normally supplied in iron or steel in sizes  $\frac{1}{2}$ " thru 12".



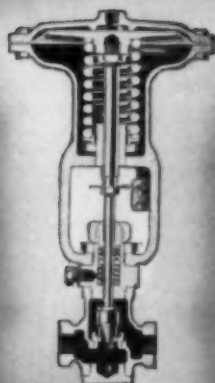
**TYPE 657YY**

Three-way control valve for by-pass or blending service. Eliminates need for two globe type control valves. Available all castable alloys sizes  $\frac{1}{2}$ " thru 12".



**TYPE 667Z**

Split type body in which parts are readily accessible; can be economically supplied in various alloys for corrosive service. Available in flanged sizes  $\frac{1}{2}$ " thru 2".



**TYPE 510G**

Small and compact bronze control valve for relatively light service. Available in screwed sizes  $\frac{1}{2}$ " thru 2".



**TYPE 657-458**

Angle control valve for handling fluids containing solids, or flashing liquids which are erosive. Normally supplied in steel flanged ends in sizes 1" thru 6".



**TYPE 657-SAUNDERS**

Fisher operator on Saunders patented valve is widely used on "hard to handle" fluids which are viscous and/or corrosive. Available in wide variety of materials in sizes  $\frac{1}{2}$ " thru 6".



*Has the control valve  
for your station*



**Special design bodies  
for process services**



**Wide selection of sizes  
and available in all  
castable alloys**



**Supplied with improved  
diaphragm operator  
that provides accurate  
valve response**

**FISHER GOVERNOR COMPANY • MARSHALLTOWN, IOWA**

**CANADIAN PLANT: WOODSTOCK, ONTARIO**

LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

# New Plants — Expansions

These highlights briefed from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, a monthly publication issued exclusively to SPI advertisers and their representatives through the South and Southwest.

## South Atlantic States

41,000 sq ft, \$200,000 warehouse underway for **Florida Metals in Jacksonville, Florida** . . . \$10,000,000 **Portland Cement Co.** plant planned for 2,490 acre **Miami, Florida** site.

**Georgia Power Co.** has applied to the F. P. C. for building license for a 60,000 kw, \$13,000,000 hydroelectric plant and dam, the **James McCoy Oliver Dam** at **Columbus, Ga.** . . .

**J. A. Jones Construction Co.** will erect \$750,000 aircraft parts division plant in **Charlotte, N. C.** for **Ronson Corp.**

Underway in **Charleston, S. C.** is the \$200,000 acetylene distributing plant and oxygen filling station of **Linde Air Products Co.** . . . **South Carolina Electric & Gas Co.'s** \$19,000,000 steam generating plant, under construction in **Columbia, S. C.**, should be producing electricity by mid-1958 at the rate of 1,204,500,000 kw yearly . . . 98 acre site in **Greenwood, S. C.** chosen for \$100,000, 15,000 sq ft **Dixie Chemicals, Inc.'s** plant for converting animal by-products into livestock and poultry feed . . . **Pelzer, S. C.** will see \$200,000 expansion program for **Pelzer Mill's** spinning frames . . . Slated for **Union, S. C.**—\$600,000 improvement for water works and \$200,000 improvement for electrical system.

1958 completion scheduled for **Appalachian Power Co.'s** \$55,000,000 **Clinch River** steam-electric generating plant at **Carbo, Va.**, which will be interconnected and integrated with **Kingsport Utilities, Inc.** and **Kentucky Power Co.**—initial generating capacity, 450,000 kw.

## East South Central

\$8,700,000 expansion planned for **Woodward Iron Co.** in **Birmingham, Ala.** . . . **Gadsden, Ala.** plans \$6,000,000 sewage disposal plant . . . \$100,000-\$125,000 government inspected poultry processing plant of 20,000 sq ft for **Guntersville, Ala.** . . . Negotiations are taking place for 130 acre site for **Ford Motor Co.'s** 250,000 sq ft aluminum foundry, being built in conjunction with **Reynolds Metals Co.'s** aluminum reduction plant, in **Listerhill, Ala.** and to be completed by the end of 1957.

13,000 sq ft addition under construction for **Borden Co.** plant in **Jackson, Miss.**

August is completion date for \$2,000,000 **Licking River** water plant at **Covington, Ky.**

5 year expansion program of \$7,500,000 planned for **Wheland Co.'s, Chattanooga, Tenn.** manufacturing opera-

✓ **Manufacturing Plants**

✓ **Utility Plants**

✓ **Large Service Plants**

tion . . . **Magnavox Co.** is planning 75,000 sq ft cabinet factory for a 30 acre site in **Knoxville, Tenn.**

## West South Central

\$120,000 expansion planned by **United Specialty Corp.** in **El Dorado, Ark.** . . . 120,000 sq ft **Arkansas Container Corp.** plant to get into operation in July at **Ft. Smith, Ark.** . . . **Baldor Electric Co.**, **St. Louis**, erecting electric motor plant at **Ft. Smith, Ark.**

At **Baton Rouge, La.** \$5,000,000 plastics plant for the **Naugatuck Chemical Div.** of **U. S. Rubber Co.** scheduled for completion in 1957 . . . **Louisiana State Rice Milling Co.** constructing \$1,250,000 drying and storage plant in **Crowley, La.** . . . \$8,000,000 caustic soda and chlorine plant planned by **Kaiser Aluminum Corp.** at **Gramercy, La.** . . . Multi-million dollar **Monsanto Chemical Co.** adipic acid plant underway at **Luling, La.**

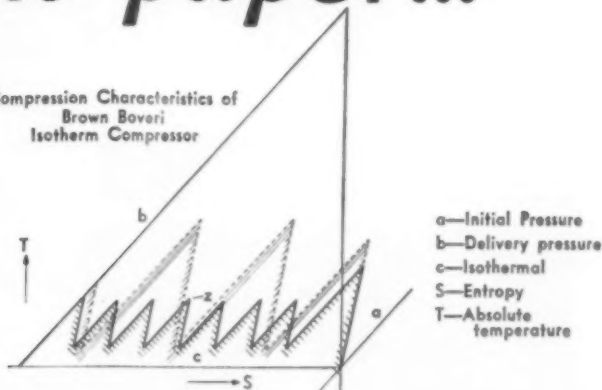
\$12,000,000 expansion project by **Ideal Cement Co.** in **Ada, Okla.** . . . **Miami, Okla.'s** tire and equipment manufacturing plant of **B. F. Goodrich Co.** is undergoing a \$4,000,000 expansion . . . **Hydrocarbon Construction Co.** will erect on a 200 acre site in **Washington, Okla.** an ammonia plant for **Phillips Pacific Chemical Co.**

June completion is scheduled for the \$1,500,000 expansion of the warehouse-office of **Alco Products, Inc.'s, Beaumont, Tex.** plant . . . Nearing completion in **Carrollton, Tex.** is the \$500,000 plant for **U.M.&F., Inc.**, manufacturers of precision sheet metal, electronic and aircraft assemblies . . . 200,000 sq ft plant being erected on 62 acre site in **Cleburne, Tex.** for **Hobbs Trailer Co.**, a division of **Fruehauf Trailer Co.** . . . **Dallas, Tex.** is watching the construction of the \$1,500,000 **Shea Chemical Corp.** plant . . . **General Electrodynamics Co.** is constructing at **Garland, Tex.** a \$200,000 electronics plant . . . Plans underway for \$7,500,000 expansion program of **Lone Star Steel Co.'s** East Texas plant at **Lone Star, Tex.** . . . Construction underway between **Channelview** and **Sheldon** on **Texas Butadiene & Chemical Corp.'s** multi-million dollar butadiene plant . . . Multi-million dollar addition planned for the **Ship Channel** plants of **Rohm & Haas Co.** in **Houston, Tex.** . . . Underway in **Houston, Tex.** is **Diamond Alkali Co.'s** **Deer Park** Plant expansion of perchlorethylene production — a multi-million dollar project . . . 15,100 sq ft electronics plant of **Vactron Corp.** is being erected at **Mansfield, Tex.** . . . **Suntide Pipe Line Co.** is constructing a \$200,000 tank farm and pumping station at **Pettus, Tex.** . . . 14 acres in **Plano, Tex.** is the site of the \$250,000 **Hubbard & Co.**, **Pittsburgh**, plant being erected for the manufacture of galvanized utility pole-line hardware.

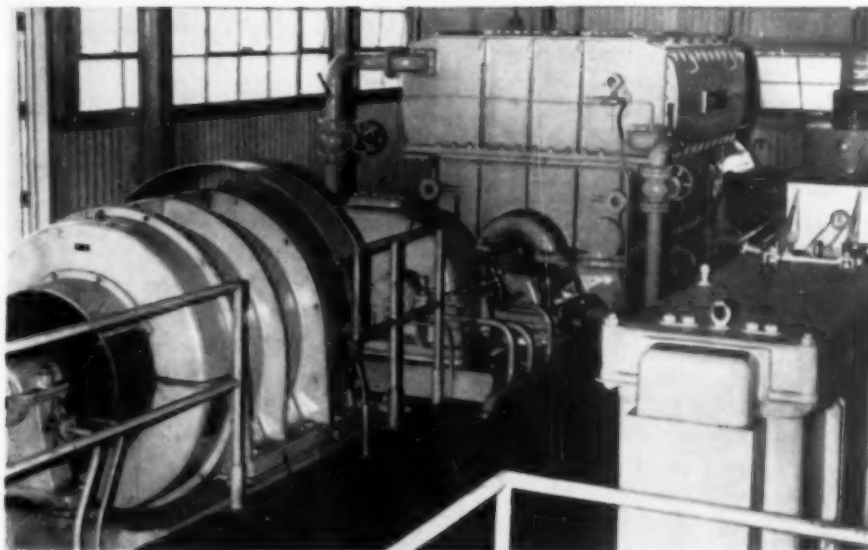
# it works on paper...

THE Brown Boveri Isotherm Compressor compresses the air along the solid line (Z) in nine stages with seven intermediate coolers. This arrangement justifies the name of "Isotherm" because compression approaches the ideal isothermal line. The broken line indicates the compression characteristic when only three intermediate coolers are used. The difference between the areas below the compression lines is a measure of the difference in required power input.

Compression Characteristics of Brown Boveri Isotherm Compressor



# it works on the job...



THE 18,000 SCFM Brown Boveri Isotherm Compressor in the new Nitric Acid Plant of the Mississippi Chemical Corporation at Yazoo City, Miss. This plant was designed and constructed by Chemical and Industrial Corporation.

A BROWN BOVERI Isotherm Compressor unit makes possible major economies in any kind of chemical processing where large volumes of air at modest pressures is required.

Each unit is completely integrated equipment consisting of the inter-stage cooled isotherm compressor, a reaction-type highly efficient expander and a synchronous motor . . . all designed, manufactured and tested by Brown Boveri to operate as a "package" unit. Its design embodies more than a quarter century's experience in producing large air volume compressors for a wide variety of purposes *plus* a world-wide reputation for leadership in gas turbines and electrical power generating and distribution equipment.

Users of Brown Boveri Isotherm Compressors are assured of greater efficiencies, substantial dollar savings in operational costs, longer life, dependable and trouble-free operation and far less maintenance than with any comparable equipment on the market today!



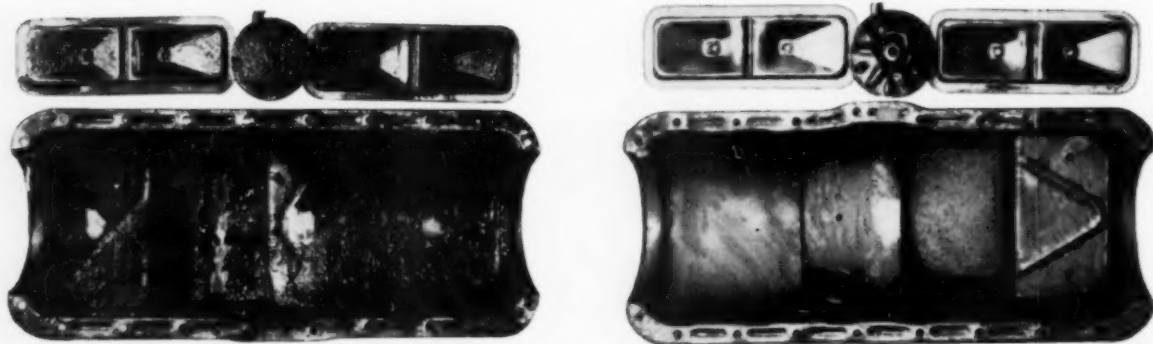
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**Sinclair RUBILENE HD** — These high viscosity index oils contain additives which provide excellent detergent — dispersant properties, oxidation resistance, bearing corrosion prevention and anti-foam qualities. They are especially suitable for stationary Diesels as well as the higher speed Diesels used in industrial plants.

**Sinclair TENOL®, SUPER TENOL and TENOL EXTRA** — A series of heavy duty, detergent—dispersant type, high viscosity index oils refined by the Sinclair Phetone Process. Recommended for all high speed automotive fleet Diesel engines, and for some engines of late design in stationary, portable and marine service. All three series contain varying degrees of additive concentrations necessary to give outstanding performance no matter what the service condition under which your Diesel operates.

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**Sinclair GASCON HD** — Heavy duty detergent type oils compounded with selected additives to provide extra detergent dispersant properties, bearing corrosion prevention, oxidation resistance and anti-foam characteristics.

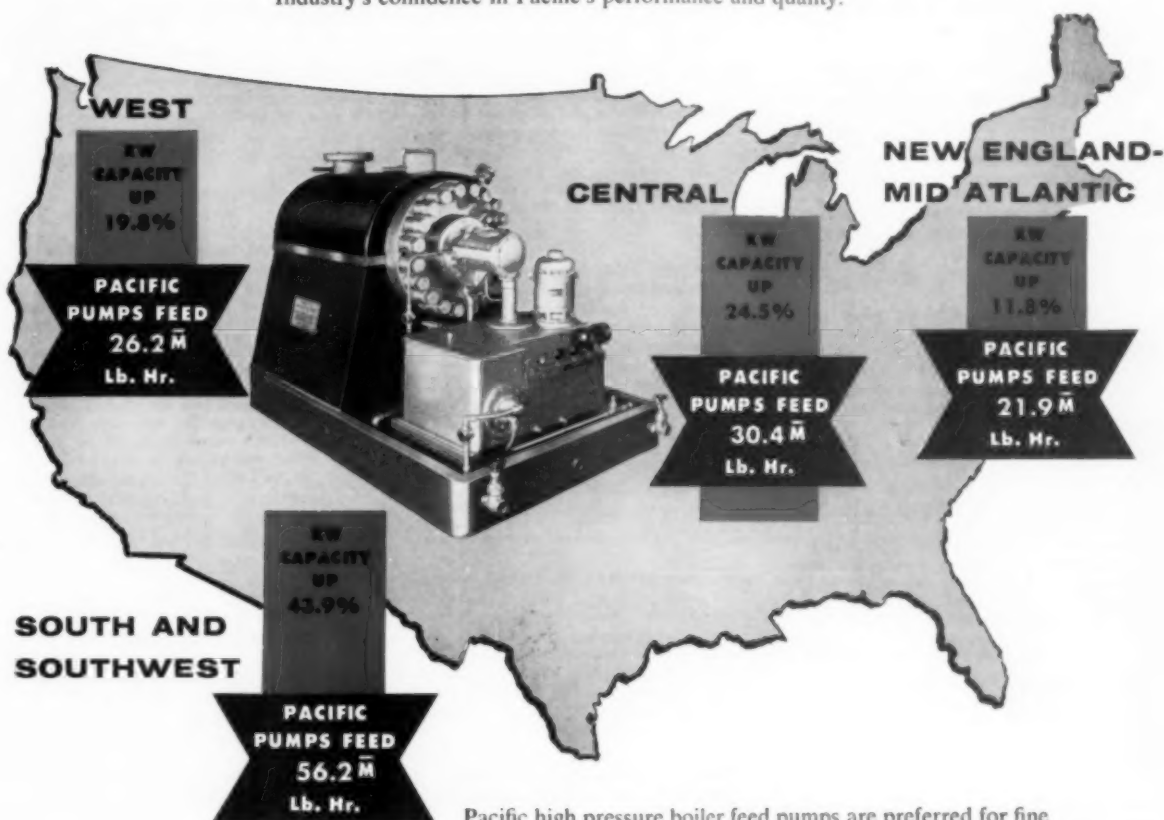
## SINCLAIR

## DIESEL OILS



# Keeping up with the kilowatts

From 1951 to 1955 the capacity of Pacific high pressure boiler feed pumps installed in each of the four regional areas of the U. S. has kept pace with the increase in electrical generating capacity in each area. This universal acceptance and repeat orders from individual Utilities in each area for 12-15 units express the Industry's confidence in Pacific's performance and quality.



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**- INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE -**

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## STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

**1 PACKAGE BOILER** — Bulletin DK-1 describes Keeler's newest compact, low cost package unit (oil or gas fired) for small space requirements. Pressures to 325 psi, steam capacities to 45,000 lb/hr. — E. KEELER CO.

**10 WATER-COOLED STOKER** — Catalog describes completely water-cooled Vibra-Grate stoker which burns low grade fuels without smoke at either low or high ratings. No dust collectors necessary. — AMERICAN ENGINEERING COMPANY.

**16 SMALL BOILER PERFORMANCE** — Brochure shows how the packaged Ljungstrom air preheater boosts performance. Boilers are small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels. — THE AIR PREHEATER CORPORATION.

**25 PACKAGED BOILERS** — New bulletin PSG-2 shows construction details and table of capacities, dimensions and weights for nine sizes of units. — HENRY VOGT MACHINE CO.

**39 PKG. AUTOMATIC BOILER** — Bulletin 1220 highlights features of Powermaster packaged automatic boilers; sizes to 500 hp; pressures to 250 psi. Factory-assembled units; compact; fuel flexibility. — ORR & SEMBOWER, INC.

**56 WATER TUBE BOILERS** — Booklet—Describes details of stoker—oil or gas or combination gas/oil, 10 to 350 hp to 250 psi; designed for easy conversion to any fuel. — QUEEN CITY ENGINEERING COMPANY, INC.

**60 PACKAGED GENERATOR** — Bulletin PG-55-3 outlines features of new generator line in capacities from 10,000 to 46,000 lb/hr. Shipped completely assembled—all ready for fuel, steam and electrical connections. — FOSTER WHEELER.

**75 INDUSTRIAL BURNERS**—Form AD-101, 4 pages—Describes and illustrates the Hev-E gas and combination oil and gas burners for commercial and industrial use. Also described are the forced draft system and electronic controls, with charts showing capacities for five models—CLEAVER-BROOKS COMPANY.

**81 FLY ASH AND DUST RECOVERY**—Engineering Booklet—Gives data and illustrations on the multiclone mechanical dust collector, showing basic principles and typical application for dust and fly ash recovery. — WESTERN PRECIPITATION CORP.

**87 STEAM TURBINES** — Single Stage — Bulletin 500 describes features and characteristics of company's type DH steam turbines in horizontal and vertical models. — DEAN HILL PUMP COMPANY, INC.

**88 INDUSTRIAL BURNERS** — General Bulletin 751, 16 pages — Describes and illustrates industrial oil burners, gas burners, combination gas and oil burners for boilers, dryers, stills, retorts, kilns, etc., and fuel oil pumping and heating units which go therewith. — NATIONAL AIROIL BURNER CO.

## FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

**108 COMPRESSOR VALVES** — Bulletin, 4 pages, describes Voss valves, used to replace the original valves in compressors of any size, type and make; gives design details, advantages, and efficiency under severe operating conditions. — J. H. H. VOSS COMPANY, INC.

**116 AIR & GAS COMPRESSORS** — Form 3132-A shows complete range of centrifugal and reciprocating units used in process and chemical industries — for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfm. — INGERSOLL-RAND COMPANY.

**128 HOW TO SOLVE PUMPING PROBLEMS** — Booklet, 36 pages — Explains the functions and characteristics

tics of Rotary gear pumps; sample application problems with charts and curves on pipe friction losses, viscosity conversion tables, materials of construction for various liquids, and additional information pertaining to pump applications. — GEO. D. ROPER CORPORATION.

**144 FLUID DRIVES** — Catalog, 24 pages — Describes and illustrates Type VS Class 4 Gyrol fluid drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp. — AMERICAN BLOWER CORPORATION.

**165 AFTER-COOLER** — Bulletin 130 shows how the Aero unit removes moisture from compressed air or gases; cools water for jackets and intercoolers; cools air or gases in both power and process systems; and protects air tools and pneumatic systems from water damage. — NIAGARA BLOWER COMPANY.

## INSTRUMENTS—METERS CONTROLS—REGULATORS

**207 AUTOMATIC OSCILLOGRAPH** — Bulletin describes features of the new RS-9 units which give more channels, faster starting, more types of starting relays, sharper traces, and lower expansion cost. — HATHAWAY INSTRUMENT COMPANY.

**211 FLUID CONTROL VALVE** — Bulletin CV-1 describes "Bellofram" construction where no force is lost at end of the stroke where spring compression requires maximum force. Sizes start at 1/2". — FOSTER ENGINEERING COMPANY.

**212 AUTOMATIC TEMPERATURE CONTROL** — Data sheets describe versatile automatic indicating temperature control offering many sequence combinations — step-heating, heating and cooling, wide limit control, or temperature control plus operation of signal devices. — SARCO COMPANY, INC.

**226 PRESSURE GAUGES** — Ashcroft Gauge Catalog, 124 pages — Information on pressure gauges, gauge access-

series and gauge engineering, sectionalized by product lines, fully indexed, with selector tables for all gauges. Illustrated with photographs and line drawings. — MANNING, MAXWELL & MOORE, INC.

**227 LIQUID LEVEL GAGES** — Bulletin 11-1-51 — Describes gages for water level or liquid level, water columns and the like — bronze, all-iron, forged steel, stainless steel for all sorts of industrial, chemical and power plant service, with details as to available sizes, applications and installations. — ERNST WATER COLUMN & GAGE CO.

**232 FLOW SWITCH** — Bulletin describes new line of automatic flow switches which signal "start," "stop" or "insufficient flow" of nearly any liquid. Can be furnished in a great variety of metals; valve sizes from 1/4" to 6". — MAGNETROL, INC.

**235 LIQUID LEVELS** — Bulletin 583 describes indicator which gives a reliable, automatic reading of storage tank contents. 20" dial in 2 x 10" case saves panel space. No outside power source needed; can be located up to 250 ft from tank. — THE LIQUIDOMETER CORP.

**240 TEMPERATURE CONTROL** — Bulletin 316 describes Accritem regulator for controlling water heaters, heat exchangers, and processes. Use where pressure and load conditions fluctuate widely and for control of large size valves. — THE POWERS REGULATOR COMPANY.

**242 CONTROL VALVES** — Catalog 1500-D — Illustrated — Describes complete line of Domotor, solenoid-operated and handwheel single seat control valves for handling difficult fluids under

extremes of temperature and pressure. Offers full, unrestricted flow, positive plug and seat alignment and directional flow flexibility. — THE ANNIN COMPANY.

#### PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

**300 CAST IRON WELDING** — Data sheets describe the new Xyron 3-25 strontium-aluminum bearing electrode for crack-free welding of gray and ductile cast iron, including Meehanite, Ni-Resist, and for joining cast iron to steel. — EUTECTIC WELDING ALLOYS CORP.

**302 INCINERATORS** — Catalogs on field-erected units (up to 8000 lb/hr) and portable models (135 to 450 lb/hr) show how you can eliminate fire hazards, lost space, and hauling costs. — PLIBRICO COMPANY.

**309 ELEVATED STEEL TANKS** — 16 p "Tank Talks" shows various types of tanks constructed and erected

by manufacturer as well as stand pipes, reservoirs, storage and high pressure vessels, cylinders, etc. — R. D. COLE MANUFACTURING COMPANY.

**326 GRATING—FLOORING** — Catalog, 12 pages — Gives picture story of "Weldforged" steel grating, flooring and stair treads — continuous spiral cross bars, alternating right and left, and slightly above bearing bars, electronically weldforged into inseparable units to insure greater non-skid protection and durability. — KERRIGAN IRON WORKS, INC.

**357 MODERN LUBRICATION** — Bulletin—Describes methods of modernizing with Manzel lubricators—pumps and compressors, wood and steel working machinery, presses, production and handling equipment. — MANZEL, DIVISION OF FRONTIER INDUSTRIES, INC.

**383 STATIONARY VACUUM SYSTEMS** — Bulletin A-939, 12 pages — Analyzes the problem of industrial dust and describes complete line of vacuum

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1	10	16	25	39	56	60	75	81	87	88
108	116	128	144	165	207	211	212	226	227	232
235	240	242	300	302	309	326	357	383	384	386
402	404	405	413	433	455	461	500	503	511	518
528	573	583	601	608	614	631	686	700	703	704
705	706	708	712	728	801	821	830	838	854	909
937	998	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9
Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18	Q-19	Q-20
Q-21	Q-22	Q-23	Q-24	Q-25	Q-26	Q-27	Q-28	Q-29		

Also send further information on following New Equipment (page 86).

E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9	E-10
E-11	E-12								

Name ..... Position .....

Company Name .....

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cleaning equipment designed to combat fit. Portable separators, water traps, material intake valves, electric bag shakers, rotary discharge valves, etc.—U. S. HOFFMAN MACHINERY CORP.

**384 FLOOR GRATING** — Catalog No. AT284 — Describes company's free planning and checking service for completely custom fabricated floor grating installations. — BORDEN METAL PRODUCTS CO.

**386 RIGID FRAME BUILDINGS** — 8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bowstring truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

#### PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

**402 FORGED STEEL VALVES** — 32 page supplement of Catalog F-9 covers new general purpose gate, globe and angle valves for 150-800 lb service.

Featuring hard faced seating surfaces.—HENRY VOGT MACHINE CO.

**404 PIPE UNIONS** — 26 p illustrated bulletin covers Jefferson line of pipe unions, giving sizes, capacities of unions, union elbows, union tees and flange unions.—JEFFERSON UNION CO.

**405 AIR LINE FILTERS** — Bulletin 200 shows how simply installed and maintained Staynew pipe line filters keep air-operated equipment free from pipe scale, dust, dirt, and condensates. Filter compressed air under all pressures and temperatures.—DOLLINGER CORPORATION.

**413 REDUCING VALVE** — Bulletin 553 gives graphic performance comparison and capacity data of the new "Hi-Flo" valve for water reducing stations, fuel oil pressure control, process lines, etc. — LESLIE CO.

**433 RENEWABLE SEAT RING GATE VALVE** — Bulletin V-123 shows how you can replace seat rings in less

than 10 minutes with valve body still installed in the line. 200 lb valves available in sizes 1/4" thru 2".—THE FAIRBANKS COMPANY.

**455 PLASTIC VALVES & FITTINGS** — Brochure covers company's extensive line of new corrosion-resistant valves and pipe fittings molded from rigid polyvinyl chloride.—WALWORTH COMPANY.

**461 REDUCING VALVES** — Data sheets describe Type CV-D (diaphragm) and Type CV-P (piston) reducing valves for application at unlimited pressures for pipe sizes up to 16". Either direct or reverse action; high rangeability.—COPESE - VULCAN DIVISION, BLAW-KNOX COMPANY.

#### MAINTENANCE PACKING GASKETS, LUBRICATION

**500 LININGS & COATINGS** — Brochure 7008, 4 p, describes company's rubber, neoprene and polyvinyl chloride lining and coating service for pipes, valves, tanks, ducts, vessels, etc. Provide protection against corrosion and abrasion in handling acids, bases, salts and fumes; coatings conductive or non-conductive, soft or hard, suitable for high or low temperature operations.—RADIATOR SPECIALTY CO.

**503 PLASTIC REPAIR COMPOUND** — Folder tells how Celastic & BBX can be used to make permanent repairs to duct work, fan housings, to waterproof cracked and leaking concrete, cover exterior insulation — 1001 uses as general repair item in any plant. — WILSON AND MANKIN.

**511 MAINTENANCE IDEAS**—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line.—KANO LABORATORIES.

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235	240	242	300	302	309	326	357	383	384	386
402	404	405	413	433	455	461	500	503	511	518
528	573	583	601	608	614	631	686	700	703	704
705	706	708	712	728	801	821	830	838	854	909
937	998	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9
Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18	Q-19	Q-20
Q-21	Q-22	Q-23	Q-24	Q-25	Q-26	Q-27	Q-28	Q-29		

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E-11	E-12								

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**518 PACKINGS & GASKET CUTTERS** — Catalog, 50 pages — Describes "The Packing That Packs All," manufactured in a variety of forms such as coil, spool, loose, rings, sets, spiral, and sheet. Designates materials available. Covers gasket cutters and related items. Illustrated with photographs and drawings.—THE ALLPAX COMPANY, INC.

**528 INDUSTRIAL PRODUCTS**—Bulletin GI-6A, 40 pages—Describes J-M Industrial products intended to save industry millions of dollars every year—insulations, refractory products, asbestos-cement pipe, packings and gaskets, electrical products, friction materials, roofing and siding, flooring, partitions and ceilings. — JOHNS-MANVILLE.

**573 PLASTISPRAY** — Catalog describes sprayed-on vinyl plastic sheeting which provides clean, attractive, maintenance free wall covering for cafeterias, restrooms, etc. Effective on exteriors — cracked and leaking stucco or masonry. Unlimited colors. — WILSON AND MANKIN.

**583 CONDENSATE CORROSION** — Bulletin No. 35, 4 pages — Describes the causes of condensate corrosion in return lines, heaters, tanks and describes methods of stopping it with various Nalco products. Well illustrated.—NATIONAL ALUMINATE CORP.

#### ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

**601 FLUID DRIVES** — Catalog, 24 pages — Describes and illustrates Type VS Class 4 Gyrol fluid drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp.—AMERICAN BLOWER CORPORATION.

**608 CONVEYOR BELT REPAIRS**—Bulletin R-700 and Folder R-4 describe the "Rema" method of making vulcanized repairs without heat. Holes, gouges, rips and tears can be repaired on the job. Curing time delay is eliminated. Belts can be put into service immediately after repair is made.—FLEXIBLE STEEL LACING COMPANY.

**614 VERTICAL TRANSPORTATION** —Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumbwaiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

**631 SCREW CONVEYORS** — Catalog ID-541, 68 pages — Illustrates and describes standard and special types of conveyors, with engineering data necessary for selection. Tables give sizes, types, speeds, horsepower and other information. Accessories included. — CONTINENTAL GIN COMPANY, INDUSTRIAL DIVISION.

**686 VARIABLE SPEED TRANSMISSIONS** — 8 p illustrated bulletin describes Speed-Trol line with positive pulley adjustment. Gives data on factors in drive selection and varied automatic and remote speed control accessories.—STERLING ELECTRIC MOTORS.

#### WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

**700 WATER CONDITIONERS** — 4 p brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

**703 AIR CONDITIONING** — Bulletins 112 & 122 describe "controlled humidity" method where cooling and heating functions are made completely separate from adding or taking away moisture. No moisture sensitive instruments needed in flexible & compact design — NIAGARA BLOWER CO.

**704 WATER CONDITIONING** — Brochure describes company's engineering services — zeolite water softeners, filters and purifiers, modernized and rebuilt water softeners, aerators and degasitors and process and boiler water conditioning. — SOUTHERN WATER CONDITIONING, INC.

**705 TEST YOUR TOWER** — Bulletin offers simple, proven method by which you can determine how closely your actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. Know your tower's capabilities and limitations. —THE MARLEY COMPANY.

**706 FEEDWATER TREATMENT** — Bulletin BI discusses advantages of using direct or internal treatment. Shows how steam quality is improved and boiler maintenance reduced.—NATIONAL ALUMINATE CORPORATION.

**708 COOLING TOWER DRIVES** — Catalog CT-53 — Gives information on the use of gear reduction drives for cooling tower applications — includes worm gear units, spiral-bevel units and helical-spiral-bevel units. Gives construction and operating details, with illustrations and selection data.—PHILADELPHIA GEAR WORKS.

**712 ION EXCHANGE EQUIPMENT**—Bulletin A-255 describes the various methods of ion exchange treatment which provide suitable boiler feedwater, process water, and purified solutions. — ILLINOIS WATER TREATMENT CO.

**728 DEMINERALIZATION** — Bulletin 5800, 40 pages — Explains the treatment of water by demineralizing,

principles of ion exchange, applications of many anion and cation exchange materials. A series of curves gives estimates of cost, design and operation. — COCHRANE-CORP.

#### ELECTRICAL

**801 MOTORS** — Bulletin describes and catalogs more popular a-c motors from 1 to 500 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

**821 ELECTRIC HEATING UNITS**—Catalog 50 — Illustrates and describes basic Chromolox electric heating elements. Sizes, ratings and uses are listed for strip, ring, cartridge and tubular types, as well as "packaged" units such as hot plates, circulation and unit heaters. — EDWIN L. WIEGAND CO.

**830 MANUAL MOTOR STARTER**—Bulletin 609 — Describes a manual starter available in enclosures for general, waterproof, dust tight and hazardous locations—with quick-make and quick-break silver alloy contacts and double overload breakers.—ALEN- BRADLEY CO.

**838 ELECTRIC POWER DRIVES** — Scale Drawings, 22 sheets — Illustrate and describe geared, electric power drives for design engineers, draftsmen and layout engineers. Three views are detailed on each sheet with the frame and type drawn to three separate scales, from ½ hp to 30 hp capacity.—STERLING ELECTRIC MOTORS, INC.

**854 ADEQUATE WIRING** — Booklet "Wire Ahead"—Discusses preventive maintenance in electrical systems—the symptoms of inadequate wiring—and plans for anticipating electrical demands. —ANACONDA WIRE & CABLE COMPANY.

#### OPERATING AIDS SUPPLIES & MISCL.

**909 INDUSTRIAL SKIN CLEANSER** —Folder describes Vi-Lan Clean, a non-alkaline, non-acid, all - purpose antiseptic skin cleanser that prevents dermatitis and other skin conditions. Self-service dispensing units. — DAMERON ENTERPRISES, INC.

**937 STEEL MEASURING TAPES** — Complete catalog describes full line of measuring tapes from 6 to 100 ft, including wide blade tape with upright measurements.—EVANS RULE CO.

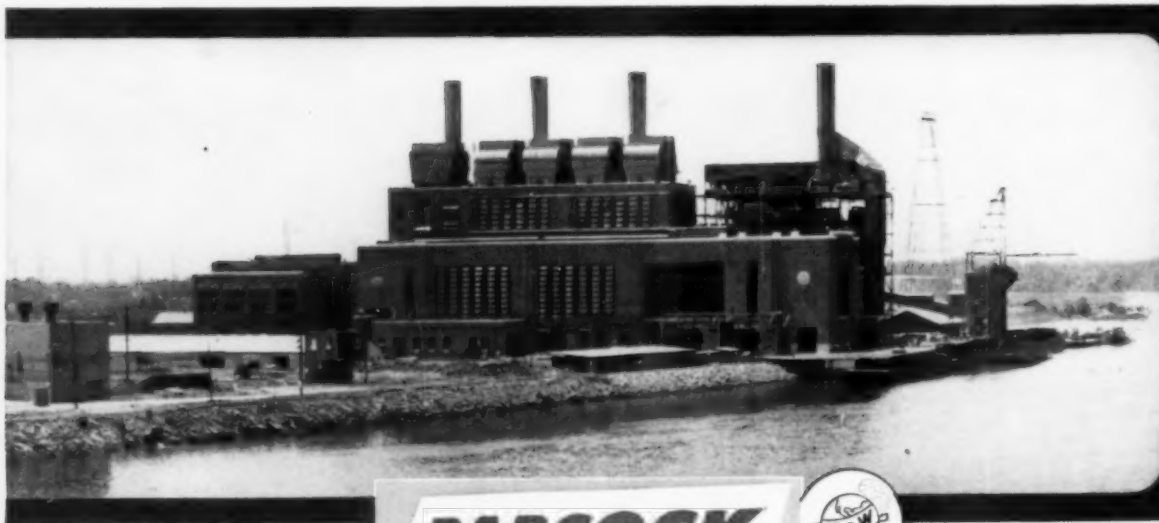
**998 FORGING AHEAD IN BUSINESS** —48 p book on problems of personal advancement. Shows how to improve your position and increase your income. Outlines executive qualifications in today's competitive market. — ALEXANDER HAMILTON INSTITUTE.

Modern Central Stations Serving America

**NEW B&W RADIANT BOILER FOR**

# BURLINGTON GENERATING STATION

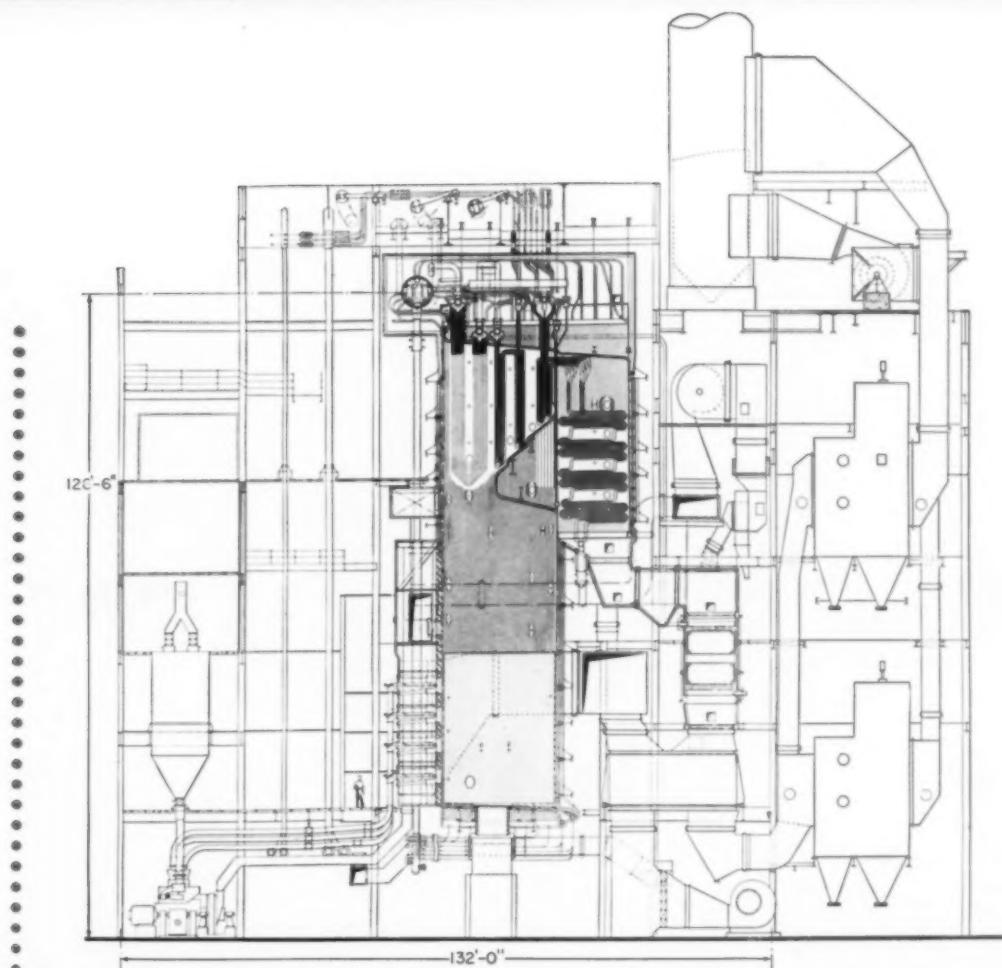
**OF PUBLIC SERVICE ELECTRIC AND GAS COMPANY**



**BABCOCK  
& WILCOX**



BOILER  
DIVISION



Supported by sound, practical engineering, Public Service Electric and Gas Company is engaged in a continuing, progressive policy of planning and over-all expansion to provide abundant, economical electricity to its large body of customers.

As part of this far-sighted program, Public Service Electric and Gas Company has installed a new, highly efficient 185,000 KW unit at its Burlington Generating Station. A B&W Radiant Boiler, generating over 1,225,000 pounds of steam per hour, contributes to the high level of performance of this new installation. The boiler is pulverized-coal-fired with provision for oil-firing, and is served by five B&W pulverizers. It is designed with divided furnace construction,

gas recirculation, pressure firing and natural circulation. Unit design pressure is high—2700 psi, and the temperature is 1100 F at the superheater outlet with reheat to 1050 F.

Modern, efficient B&W steam generators, such as the latest unit at Burlington, are the results of long experience in designing, fabricating, erecting and servicing central station boilers of all types. Reinforcing this experience is an unending program of B&W research and development aimed intensively toward achieving still higher efficiency levels in the future.

The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-753



No  
**PLUNGER ELECTRIC**  
installation  
is too  
**large**

**NEW BOOKLET**

Booklet A-414 describes the NEW Otis Plunger Electric Freight Elevator designed for low-rise, light and heavy duty freight handling requirements. We'll be glad to send this booklet to you.

# BETTER ELEVATORING IS



**ELECTRIC • PLUNGER ELECTRIC**  
**freight elevators**  
**LIGHT, GENERAL, AND HEAVY DUTY**  
**ELECTRIC DUMBWAITERS**

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N. Y.



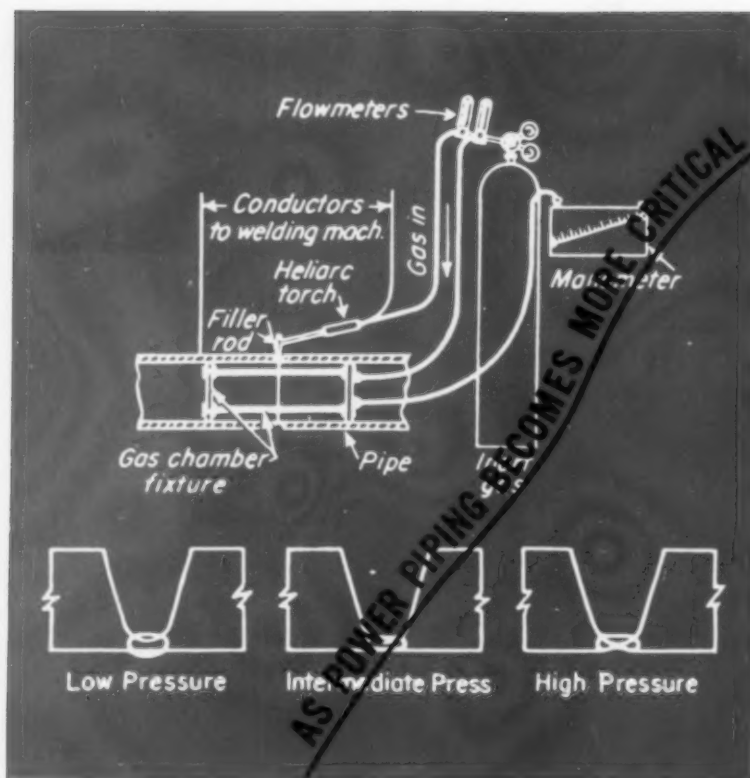
No  
**PLUNGER ELECTRIC**  
installation  
is too  
**small**



# THE BUSINESS OF OTIS

OFFICES IN 294 CITIES ACROSS THE UNITED STATES AND CANADA

SOUTHERN POWER & INDUSTRY for MAY, 1956



# **KELLOGG'S** **FIELD** **WELDING** **TECHNIQUES** **KEEP PACE**

With main and reheat steam piping for steam-electric power plants becoming heavier and more difficult to handle because of increasing wall thicknesses, more and more of the welding previously done in fabricators' shops must be handled in the field. This, coupled with the need for still better welding techniques to combat higher operating pressures and temperatures, demands even higher standards of design and workmanship to compensate for the less favorable conditions often encountered in the field.

One way in which M. W. Kellogg sets the pace in field fabrication is with K-Weld®—Kellogg's unique

inert gas shielded technique of arc welding. With K-Weld, complete penetration and a highly uniform internal contour are assured without the use of backing rings. Incorporating a Kellogg development which controls internal gas pressure and shape of the interior weld surface automatically, K-Weld is recognized as the ultimate in welding techniques for any type or size of alloy piping—both for shop and field fabrication.

A 12-page booklet, "For The Modern Central Power Station," describes K-Weld and other M. W. Kellogg facilities for the design, fabrication, installation, and testing of main and reheat steam piping.



K-Weld root bead is laid while the pipe interior is under controlled inert gas pressure in the gas chamber fixture. Diagram at top of page shows detail of this portable gas chamber fixture and how interior weld surface is controlled by varying pressure.

K-Weld is always under the supervision of a Kellogg inspector, supplementing final radiographic inspection. In addition, a permanent chart record is made on the potentiometer of all steps in welding and stress relieving.

## **FABRICATED PRODUCTS DIVISION**

**THE M. W. KELLOGG COMPANY, 711 THIRD AVENUE, NEW YORK 17, N. Y.**

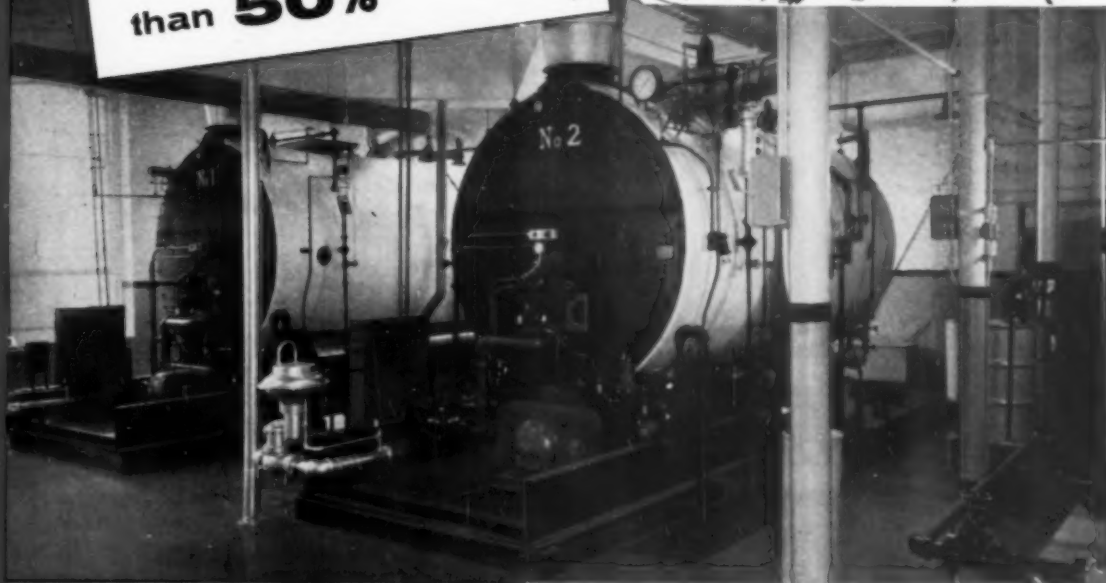
*The Canadian Kellogg Company, Ltd., Toronto • Kellogg International Corporation, London*

SUBSIDIARIES OF PULLMAN INCORPORATED

\*Trademark of and patented by The M. W. Kellogg Company



Newberry Mills  
survey showed plant  
engineers how to  
cut fuel costs more  
than **50%**



Two 250-hp Cleaver-Brooks boilers replace four obsolete units. "Most attractive boiler room in the South," says Newberry Mills.

## Two new Cleaver-Brooks boilers

**SAVE**  
**\$23,445**  
*the first year*



Send us your name to receive regular issues of new "Cleaver-Brooks Bulletin" — the boiler newspaper!

**Cleaver-Brooks®**

TWENTY-FIVE YEARS OF LEADERSHIP  
BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

G. B. Sessions, superintendent of Newberry Mills, says, "Eighteen months ago we installed two new Cleaver-Brooks boilers at Newberry Mills, Newberry, S.C., that are paying for themselves at a fast clip. At the present rate of savings, the boilers will be paid for in less than two years of operation. Fuel costs have been cut more than 50%."

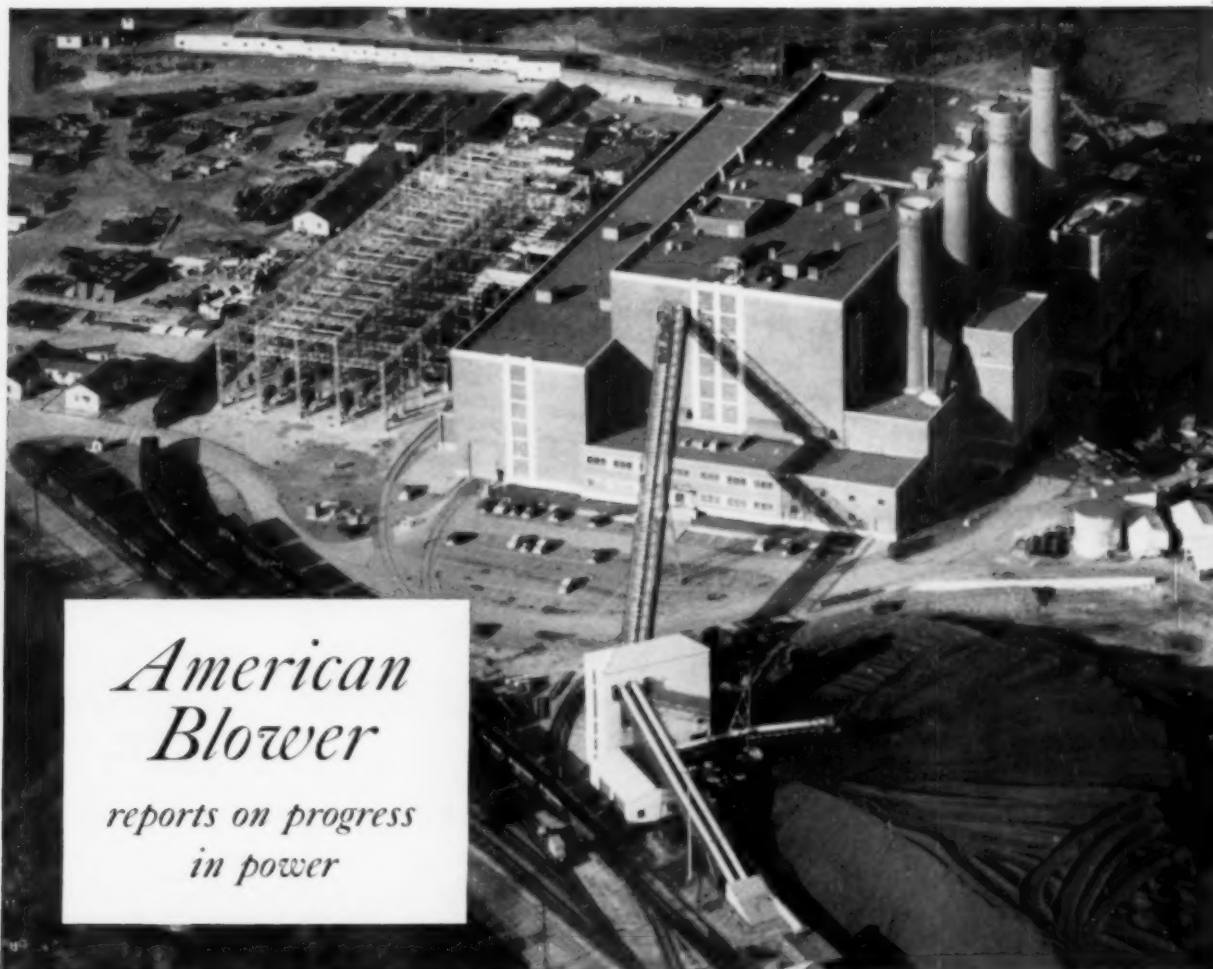
When Newberry Mills engaged consulting engineers to analyze their heat and power load, they learned the startling facts of boiler obsolescence. They learned how they could cut operating costs with efficient boiler equipment. Their experience proves how the new boilers provided fuel and labor savings, a clean boiler room, free of soot, and reduced maintenance costs.

The savings on fuel for the first year of operation were an impressive \$14,045.41. Maintenance savings amounted to \$9,399.59. Periodic checks showed boilers performed at a fuel-to-steam efficiency of 82.88% on No. 6 oil.

Efficient Cleaver-Brooks four-pass construction with forced draft give you more for your fuel dollar. Four pass design maintains high gas velocity for effective scrubbing action. Forced draft design keeps fans running cool and trouble-free.

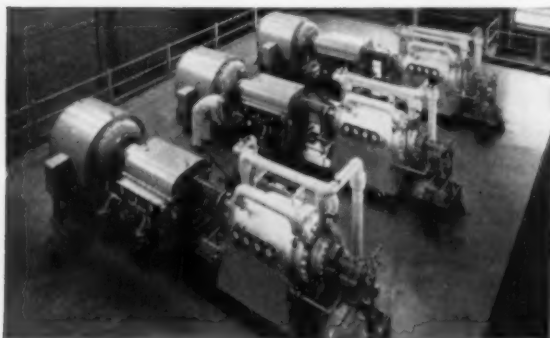
**PERIODIC SURVEYS PAY.** Find out how you can save with Cleaver-Brooks boilers. Get in touch with your local Cleaver-Brooks representative, or write: Cleaver-Brooks Company, Dept. F, 304 E. Keefe Ave., Milwaukee 12, Wis. Cable address: CLEBRO — Milwaukee — all codes.

# Potomac Electric Power



*American  
Blower*  
*reports on progress  
in power*

The Potomac River Plant is one of three PEPCo electric-power giants serving Washington, D.C., and nearby areas of Maryland and Virginia.




At PEPCo's Benning Plant, three American Blower Gyrol Fluid Drives provide adjustable-speed control for boiler-feed pumps. Each is rated at 1250 hp at 3600 rpm. Six Gyrol Fluid Drives for the same application are installed at the Potomac River Plant — each is rated at 1750 hp at 3600 rpm.

American Blower Forced Draft Fans are also installed at the Potomac River Station. Fans on Boilers 1 and 2 are rated at 113,000 cfm @ 100°F @ 11.0" sp @ 1150 rpm. Fans on Boilers 3 and 4 are rated at 111,000 cfm @ 100°F @ 17.5" sp @ 700 rpm.



# records all-time peak load: 810,000 kw



Potomac Electric Power Company's new high peak load of 810,000 kw in 1955 marked a 9.3% increase above the peak of the previous year. Although it was appreciable, the boost is only the beginning.

The coming years will see the continuation of an expansion program in which Potomac Electric Power Company has been engaged since the close of World War II . . . to better serve its more than 320,000 customers in the District of Columbia, and areas of Maryland and Virginia. During the 14-year period, 1947 to 1960, additions to PEPCo's electric plant are expected to total \$320 million.

As an important part of its power build-up, PEPCo relies on American Blower Mechanical Draft Fans for efficient air handling and Gyrol Fluid Drives for smooth power transmission.

Like PEPCo, many other progressive utilities depend on American Blower equipment to meet rigid power-plant demands. Perhaps we can serve *you*, too. Call our nearby branch office for full data on our Mechanical Draft Equipment, Fly Ash Precipitators, Heavy Duty Steam Coils, and Gyrol Fluid Drives for boiler-feed pump and fan control.



American Blower Sirocco Induced Draft Fans service four boilers at the Potomac River station. Latest fans are rated at 160,000 cfm @ 250°F @ 18.0" sp. @ 667 rpm.

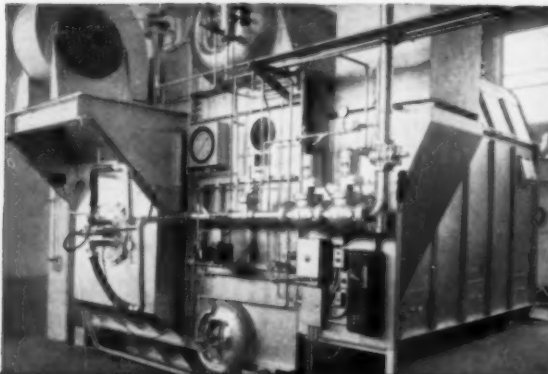
AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of AMERICAN-Standard

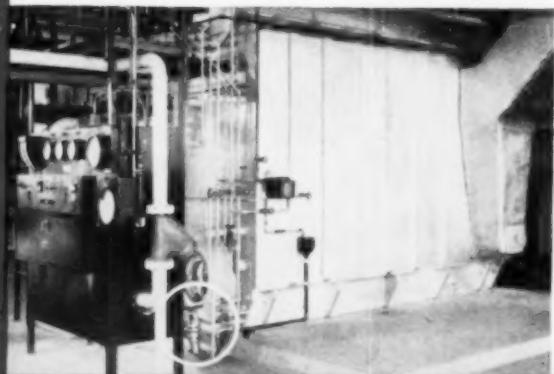
AMERICAN  BLOWER

the blow-off valve trend  
on "package" boilers is

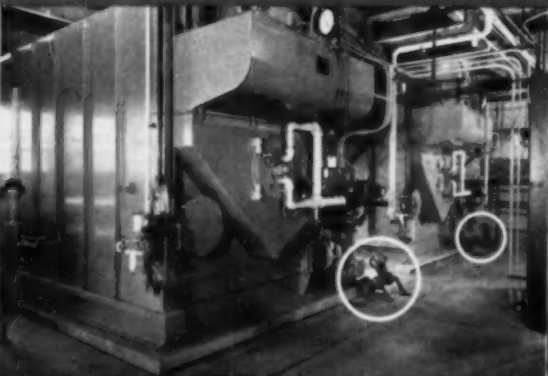
**YARWAY SEATLESS**



• E. KEELER



• COMBUSTION ENGINEERING



• TITUSVILLE



• KEWANEE-SPRINGFIELD

**YARWAY**

**BLOW-OFF**

■ More and more leading manufacturers of package-type boilers are featuring Yarway Blow-Off Valves on their units. Many are standardizing on Yarways.

The reason—good blow-off valves help good package boilers *perform better*.

Yarway—known for nearly 50 years for *quality* blow-off valves—offers advanced design, dependable service, and reasonable cost . . . three features attractive to all boiler users.

The Yarway Seatless Blow-Off Valve, with

balanced hollow sliding plunger and no seat to score, wear, clog or leak, is the most widely used valve for low and medium pressures.

Specify Yarway Seatless Blow-Off Valves on your package boilers. All boiler makers will supply them.

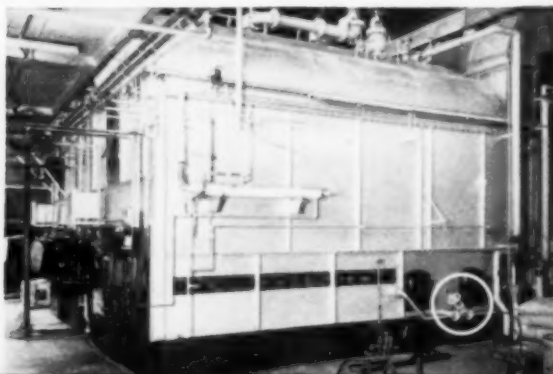
For full description of Yarway Seatless Blow-Off Valves write for Yarway Bulletin B-426.

#### YARNALL-WARING COMPANY

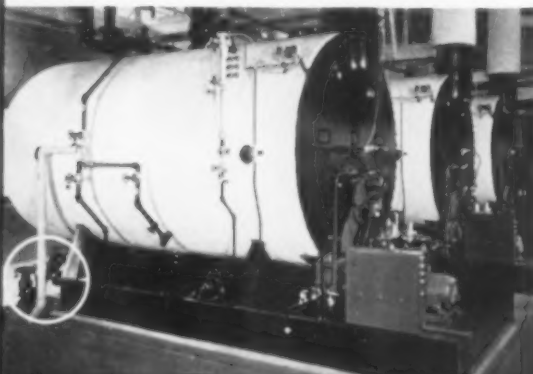
Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.

*Southern Representative:*

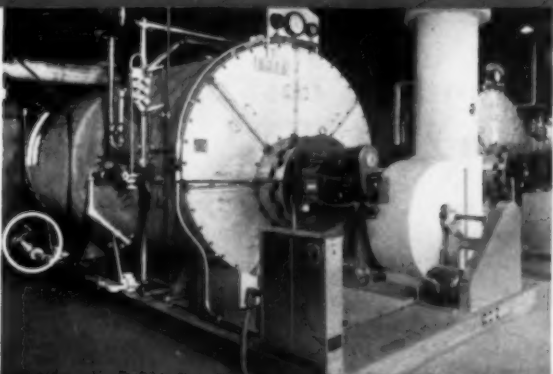
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.



• ERIE CITY



• CLEAVER-BROOKS



• PREFERRED UTILITIES

• Yarway Seatless Tandem Blow-Off Valve, angle-angle combination, straightway-angle or straightway-straightway tandems also available.

## VALVES

• Yarway Seatless Tandem Blow-Off Valve (angle-straightway combination) with angle valve sectioned to show balanced sliding plunger design.





## Lubrication—the only maintenance cost of these high-pressure Crane valves

**THE CASE HISTORY**—When an oil can is all you need to keep high pressure valves at peak efficiency year after year, you know your valve investment is a wise one.

That's how Philadelphia Electric Company feels about the Crane Pressure-Seal Bonnet Gate Valves at its Delaware Station—one of this utility's newest units, started up early in 1953.

The Crane valves, operating on boiler feed service at 2000 psi, 500° F., have demonstrated completely their maintenance-saving values.

The old practice of re-stressing

bonnet bolts doesn't apply to these valves. Yet the body-bonnet joint remains completely tight. Never a leak; never a need for a wrench. Crane Pressure-Seal design, utilizing internal fluid pressure, maintains a positively leakproof metal-to-metal joint inside the body.

The seats and stuffing box on all valves remain equally tight. Operation is smooth, nonsticking. The Crane flexible wedge disc prevents binding under contraction.

Other value features of Crane Pressure-Seal design are compactness . . . weight saving with no loss

of strength . . . and clean exterior lines that simplify insulation.

Power plants around the world report new performance records for Crane Pressure-Seal Bonnet Valves. Now's the time to consider this advanced design—in gates, globes, angles and stop-checks—for modernization or extension projects. Contact your local Crane Representative or write to address below.

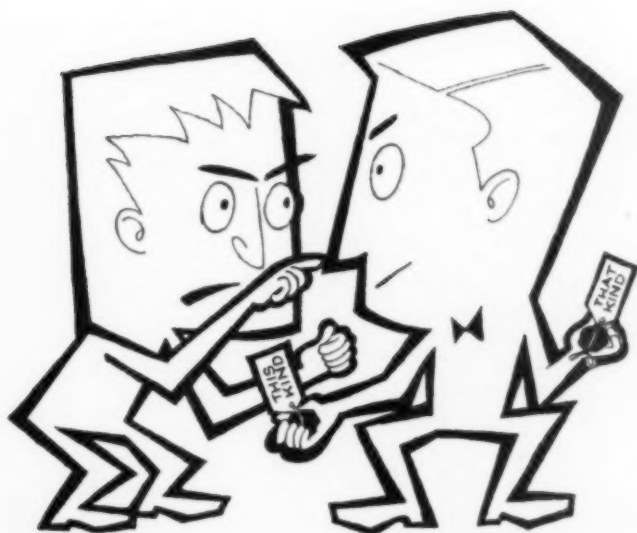


# CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

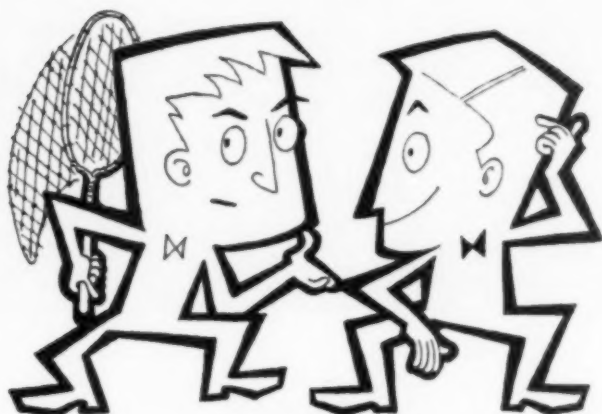
*Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas*





What's the big idea  
buying several kinds  
of coal for our  
steam plants?

It's a good idea. The kind of coal that burns  
most economically in the old boilers isn't  
efficient for the new ones.



How do you know  
you're right?

Look at the coal bills. We are generating  
more steam at a lower fuel cost. You can tell  
from the ashes we are getting more complete  
combustion, and there's less clinkering.



Where did you  
get this idea, anyway?

From the C & O Coal Department. They  
convinced us that different types of burning  
equipment need different types of coal. From  
the high quality coal produced on the C & O,  
we selected the quality and size of coal that  
works best in our particular installations.



There's a lot more to buying coal than  
the cost per million BTU. Why not con-  
tact coal producers on the C & O to  
solve your particular fuel requirements,  
or write to: R. C. Riedinger, General  
Coal Traffic Manager, Chesapeake &  
Ohio Railway Co., Terminal Tower,  
Cleveland 1, Ohio, for the assistance of  
a C & O fuel service engineer.

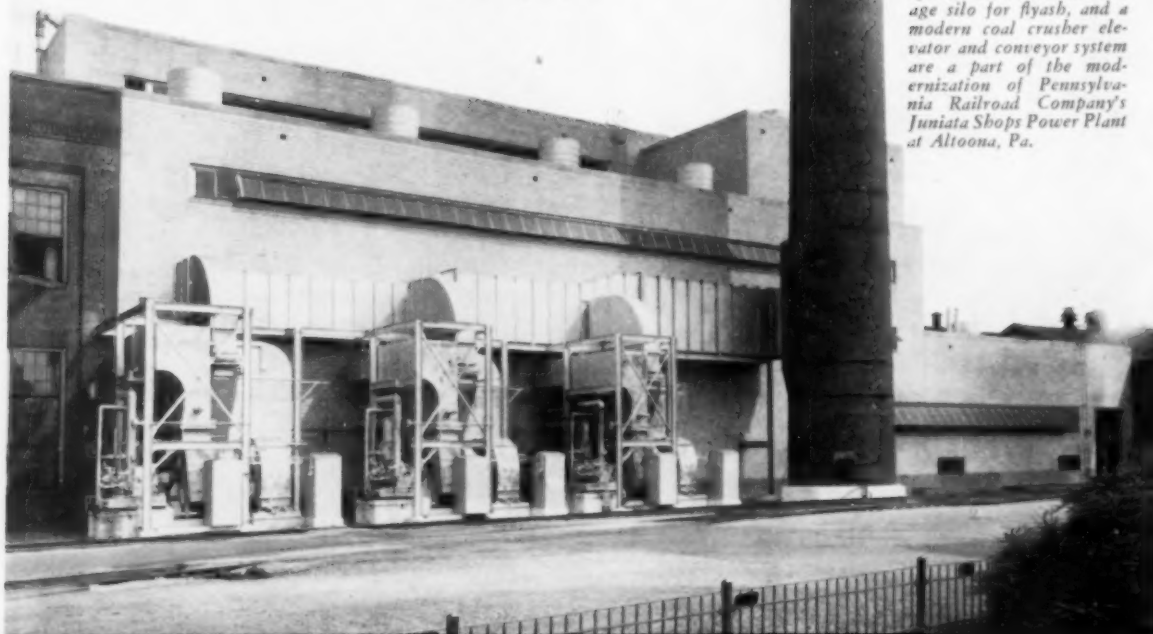
**Chesapeake and Ohio Railway**

WORLD'S LARGEST CARRIER



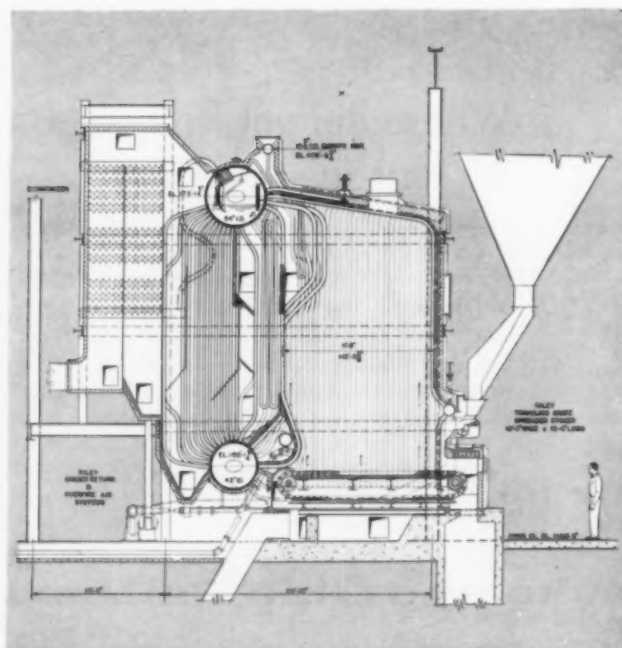
OF BITUMINOUS COAL

**Gibbs & Hill, Inc.**  
Consulting Engineers



A modern tile building, a pneumatic ash conveying system with railroad storage silo for flyash, and a modern coal crusher elevator and conveyor system are a part of the modernization of Pennsylvania Railroad Company's Juniata Shops Power Plant at Altoona, Pa.

**It pays to MODERNIZE . . . and with**



Three 60,000 lb/hr. complete Riley units operating at 600 psig, 675F were installed with auxiliaries and generating equipment during modernization without interruption to plant steam flow. They replace eight old units and have an efficiency rate over 85%.

Riley Traveling Grate Spreader Stokers with Riley Hydraulic Drives have a constant grate speed from zero to full load. Riley overthrow feeders feature dust tight and self-lubricating feeding mechanisms.



**RILEY designs, engineers, manufactures and erects complete steam generating**

Another **POWER MODERNIZATION AWARD**  
featuring **RILEY Steam Generating Equipment.**



## Pennsylvania Railroad Modernized its Juniata Shops Power Plant

*resulting in*

- 40% more steam
- 41.6% higher efficiency
- A net boiler investment of 2.5 mills per btu.
- A net annual return of 20% on investment



*Before Modernization*

### RILEY STEAM GENERATING AND FUEL BURNING EQUIPMENT

As a result of an exceptionally well planned modernization program Pennsylvania Railroad Company's Juniata Shops at Altoona, Pa. now has a modern plant operating at 41.6% increased efficiency, with 40% more steam, and with exceptionally low-cost electrical generation; adding these advantages to savings in shop manhours and operating labor and lower maintenance, the net annual return on the cost of this modernization amounts to 20%: a half million dollars per year—enough to pay for the entire modernization program in five years.



A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

# RILEY

*Stoker Corporation*  
WORCESTER, MASSACHUSETTS

Sales Offices: Worcester, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Houston, Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.

Riley Stoker Corporation equipment has played an important part in modernization programs such as this. Out of twelve companies winning POWER awards for modernization of steam power facilities in 1955, five featured Riley Boiler Units and Fuel Burning Equipment . . . and each of these Riley customers had unique programs requiring close cooperation between Riley, the customer, and its consulting engineer. This outstanding record is proof of the high quality and dependability of Riley equipment, and of Riley's ability to provide the skilled engineering and other services needed for a successful modernization program.

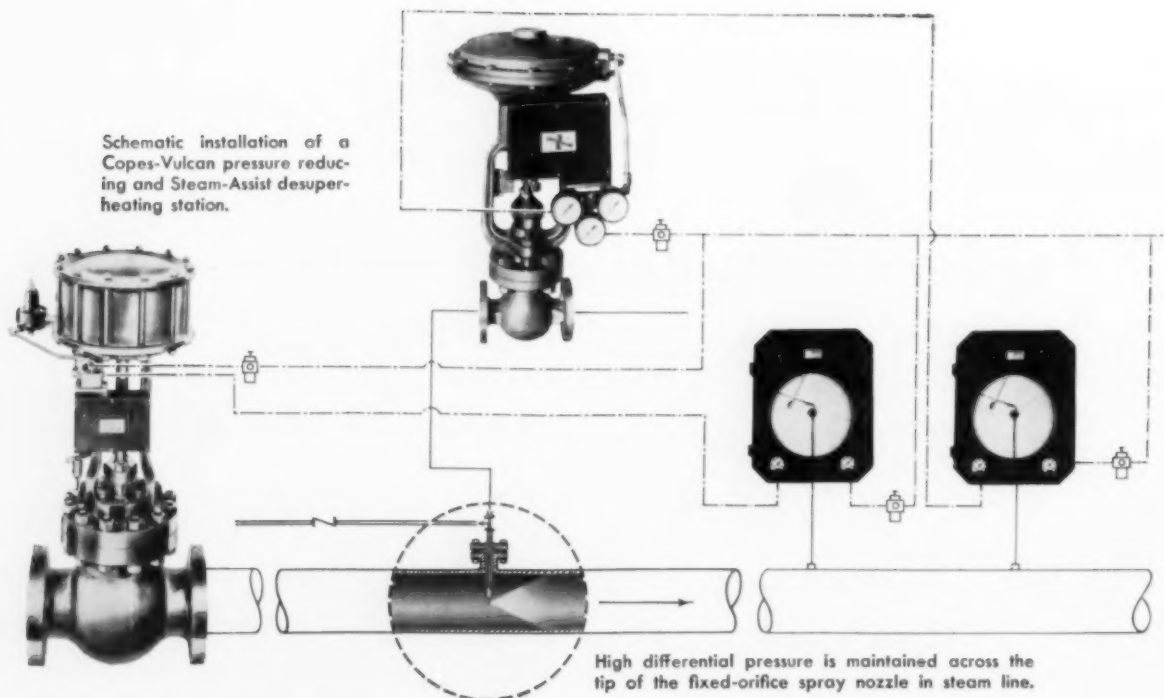
#### POWER MODERNIZATION AWARD WINNERS WITH RILEY STEAM GENERATING AND FUEL BURNING EQUIPMENT

Carbide & Carbon Chemicals Co.	Western Electric Co.
Iowa-Illinois Gas & Electric Co.	Garlock Packing Co.
Bendix Aviation Corporation	The Flintkote Co.

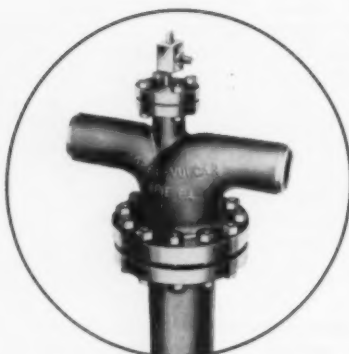
#### A FEW OTHER COMPANIES THAT HAVE MODERNIZED WITH RILEY STEAM GENERATING AND FUEL BURNING EQUIPMENT

Hawaiian Commercial & Sugar Co.	U. S. Rubber Co.
Champion Paper & Fibre Company	Kennecott Copper Container Corp.
A & P Corrugated Box Company	Kellogg Company
Hollingsworth & Whitney	Masonite Corp.
Colorado Fuel & Iron Company	White Motor Co.
Gaylord Container Corporation	Stokely Foods
Thomas A. Edison, Inc.	Carrier Corp.
Continental Can Company	

**units for Public Utility Central Stations and Industrial Power and Heating Plants**



## NEW Copes-Vulcan Pressure Reducing and Desuperheating Stations



Copes-Vulcan offers in-line or carburetor type Steam-Assist, or simple mechanical-atomizing desuperheaters.

These high-quality pressure reducing and desuperheating stations offer the latest advances in reducing valves and desuperheaters. They give you an integrated station designed specifically to meet your operating needs.

Copes-Vulcan valves—diaphragm or piston operated, depending on your conditions—give close modulating control. Simplified design means optimum operating characteristics with easy, low-cost maintenance.

The Steam-Assist Desuperheater advances a new principle in reducing steam temperatures. Cooling water and assisting steam are mixed in the exclusive swirl chamber, upstream from the point of injection. No large steam bubbles form to cause hammer or vibration. Flow of assisting steam can be automatically reduced as load increases, and shut off completely at high loads where no more than mechanical atomization is needed.

"Packaged" control systems by Copes-Vulcan mean undivided responsibility, custom design and lifetime engineering service. They assure top performance over an unusually long service life.



**COPES-VULCAN DIVISION  
BLAW-KNOX COMPANY**

Erie 4, Pennsylvania

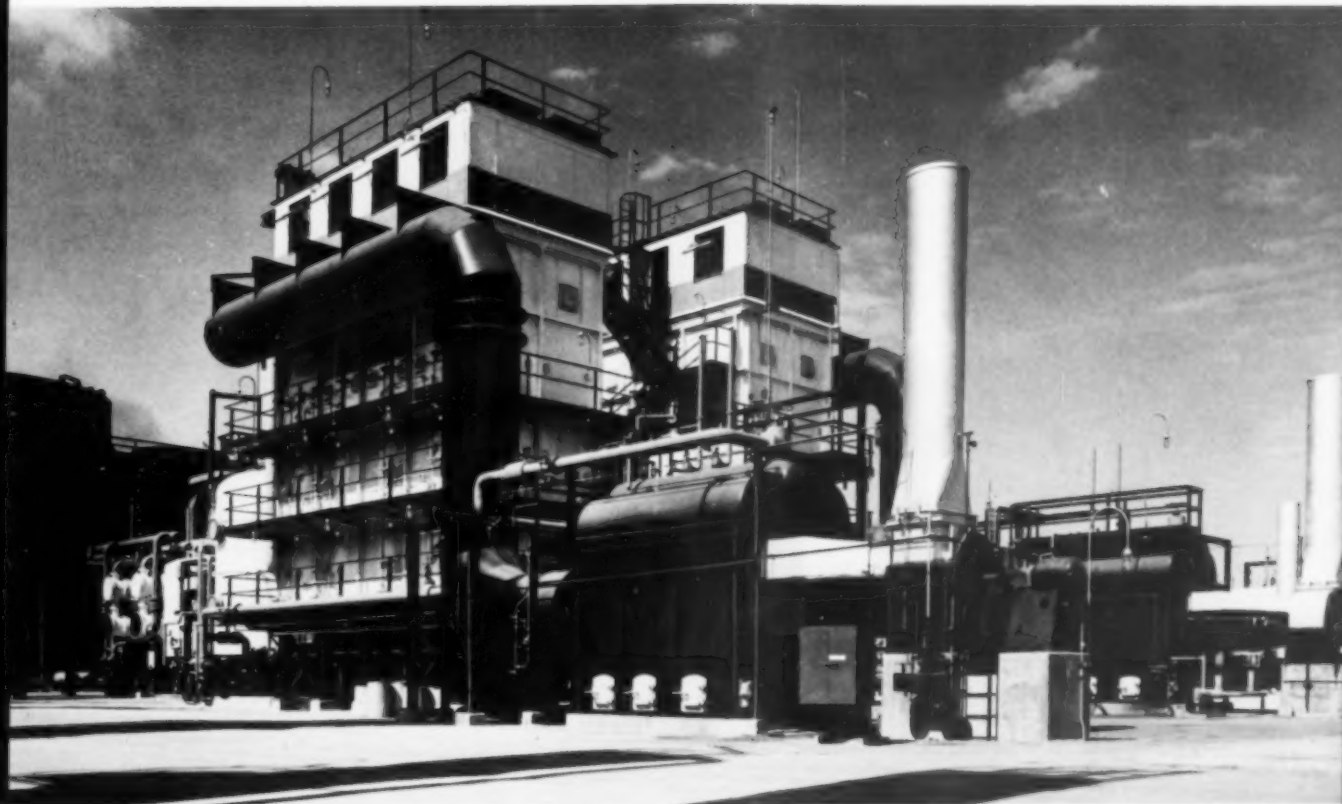
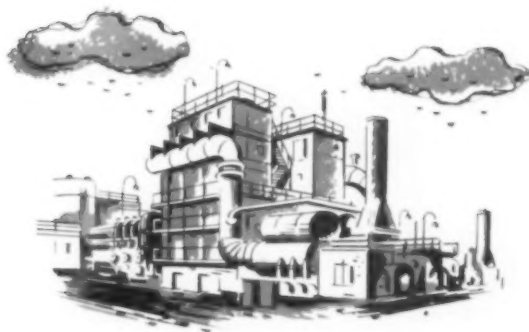




Water treatment by

# NALCO

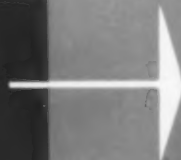
protects boilers and cooling system of big new ammonia plant

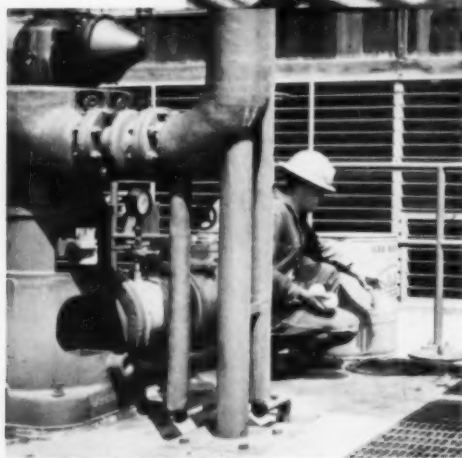
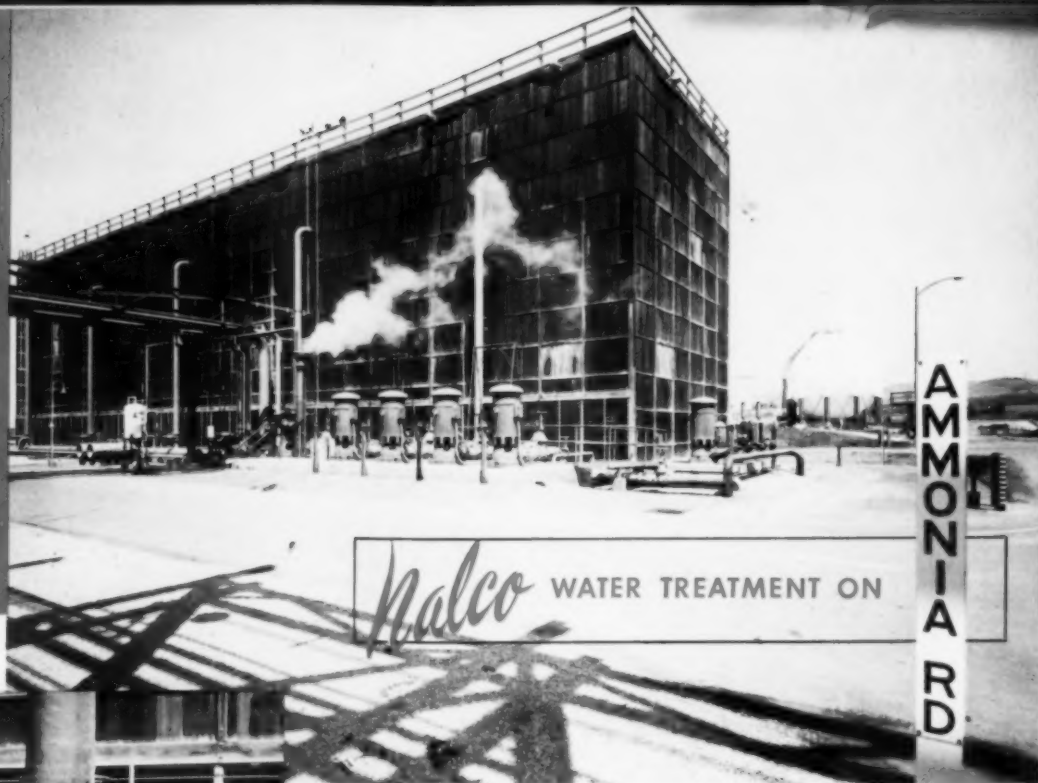


Processing units (left) and Nalco-protected waste heat boilers in new \$13 million Brea Chemicals, Inc. ammonia plant.

When \$13,000,000 goes into a brand new ammonia plant . . . equipment, services and supplies must be right up to snuff from the start. The Nalco System has been working here from the beginning—and the Nalco treatments and services rendered in a successful plant-wide program point up the advantages to be gained with the Nalco System in plants new or old.

See the next page  
for details on Nalco results  
on Ammonia Road.





Top—Large cooling tower at this new west coast ammonia plant gets protection against scaling and corrosion with a non-toxic Nalco formula. Low pH treatment stops deterioration of cooling tower lumber and cuts dosage requirements for slime and algae control.

Above—Ball form cooling water treatment is merely dropped into a simple wire basket device suspended in cooling tower basin.

Nalco System treatments on Ammonia Road solve these important water and steam processing problems: scale and corrosion prevention in both water and steam systems; boiler-water foam control and sludge-conditioning; and contamination-free process steam.

Whatever your water treatment problems may be—in a plant of any size—there is a Nalco System program designed to solve them, permanently . . . and economically. Write or phone today for details.



Above—Three steam generators on outdoor settings provide super-pure steam for ammonia processing and heating. Nalco chemicals in ball-briquet form are put into by-pass feeders (left) to insure trouble-free water treatment on Ammonia Road.



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CORPORATION**

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6216 West 66th Place  
Chicago 38, Illinois

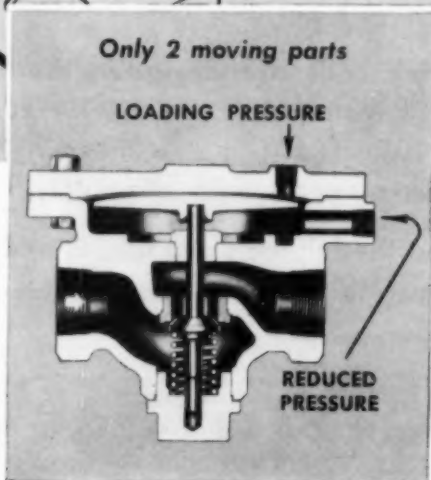
In Canada, Alchem Limited  
Burlington, Ontario

**THE**

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**SYSTEM . . . Serving Industry through Practical Applied Science**

# Now Leslie brings you this New NO MAINTENANCE\* Reducing Valve



This shows simplicity of Leslie Class G-1 pressure reducing valve.

HERE IS AN AMAZINGLY SIMPLE air loaded, diaphragm operated, pressure reducing valve that is virtually maintenance-free for steam heat or process steam application.

Only two moving parts and no seals, no stuffing boxes, no small dirt-catching parts — practically nothing can get out of order! And a stainless steel hardened main valve with highly polished finish minimizes wear.

This new Leslie valve instantly feels the effect of any flow change and responds to changes as small as 0.1 psi. It can be adjusted easily from minimum to maximum of reduced pressure range from a remote point, even a thousand or more feet away.

This valve is used in steam process and heating lines. And, its uses are unlimited for any steam reductions within body material limits (250 psi, 450°F).

Ask your Leslie engineer to tell you more about this amazing valve. He's listed in your classified directory under "Valves" or "Regulators".

*\*guaranteed no maintenance for 3 years.*

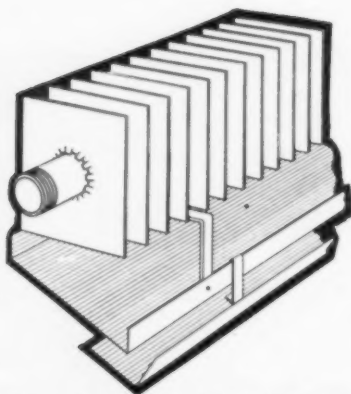
*Send for Bulletin 561 today.*



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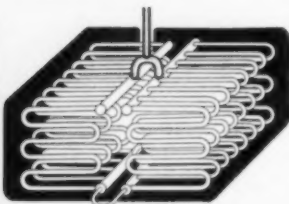


Butt-welded coils are stronger than the original pipe.

Frick Patented square-finned steel pipe is preferred for cold storages, freezers, etc. Seven-inch fins, spaced 1" or 1½", are bonded under tons of pressure, then galvanized.



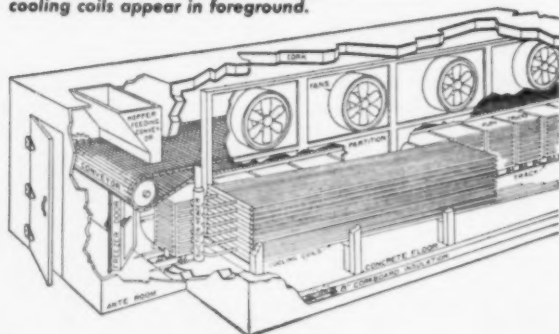
Spiral-finned coils are built in any style wanted. Pipe is ¾" steel; assembly is hot-dip galvanized.



Above: Type VW coils have many uses, offer many advantages.

Left: Patented direct-expansion Frick coils more than double the production of synthetic rubber reactors.

Below: Quick-freezing tunnel equipped with both conveyor and push trucks, able to handle ANY foods. Inclined cooling coils appear in foreground.



## COOLING COILS

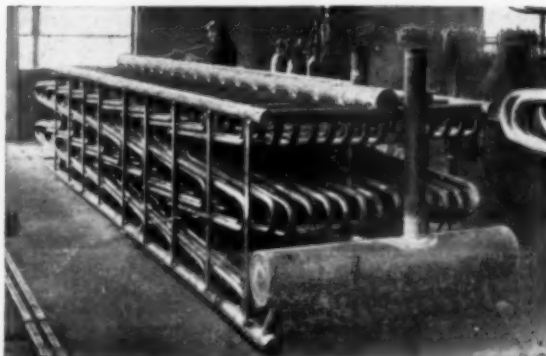
Are furnished in any style, any size, for any refrigerant: finned or bare pipe, welded or threaded, black or galvanized. Many exclusive types available.

Frick coils are designed, built, and installed . . . COMPLETELY ENGINEERED . . . to meet your exact needs most effectively.

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Below: Vertiflow coils are unexcelled for chilling water or the brine in ice tanks.





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**"KING-SIZE"**  
**FOR**  
**KINGSTON**



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At the TVA's Kingston Steam Plant (the world's largest) the total capacity is 1,600,000 Kilowatts, made up by four 150,000 KW steam turbogenerators and five 200,000 KW turbogenerators.

80,000 sq. foot condensers, drawing 65,000 gpm. of cooling water, are spring mounted on the exhausts of the 200,000 KW turbines. 60" dia.

Garlock Rubber Expansion Joints installed between condenser water inlet and concrete imbedded water piping, compensate for misalignment and provide for expansion and contraction.

These "King-Size" Rubber Expansion Joints are only part of "the famous Garlock 2,000" . . . two thousand different styles of gaskets, packings, and seals to meet *all* your needs . . . the *only* complete line available.

Call one of Garlock's 125 factory trained representatives for *unbiased* recommendations, or write for Expansion Joint Folder AD-137.

**THE GARLOCK PACKING COMPANY, Palmyra, New York**

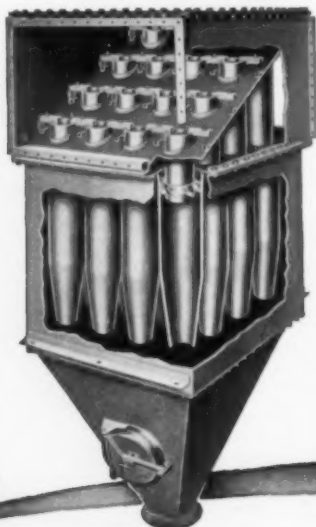
For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada

# **GARLOCK**



*Packings, Gaskets, Oil Seals, Mechanical Seals,  
Rubber Expansion Joints*

Before you buy any equipment for recovering fly ash . . .



# COMPARE ALL OTHERS against MULTICLONE'S Multiple Advantages

Because the advantages of MULTICLONE are so clear-cut, so vitally important, so far-reaching in the savings they make, we urge you to make a factual unbiased comparison of MULTICLONE fly ash collection equipment against *any other* in the mechanical recovery field. Only by making such a comparison can you fully appreciate the major savings and greater performance you get by installing MULTICLONE Collectors!

## COMPARE Recovery Efficiency!

It is a recognized fact that the separating efficiency of a cyclonic tube increases as the tube diameter decreases because smaller tubes generate greater centrifugal forces. The patented vane in the MULTICLONE makes the use of small tubes practical without complicated manifolding and permits compacting many small tubes into one simple, highly efficient unit. MULTICLONE's higher centrifugal forces throw out not only the large, medium and small particles, but also an unusually high percentage of the extremely small particles of 10 microns and less. Result—more complete recovery of all suspended particles from the gas stream!



## COMPARE Space-Saving Compactness!

Plant space costs money—particularly at today's high construction costs. Because the MULTICLONE is more compact, size for size, it makes *really important* savings in space and plant costs. Note in the chart how the MULTICLONE requires substantially less space—both in floor space and cubic space—than any other unit of comparable capacity and performance. This means vital savings in construction costs!

Make	Relative Space Requirements In Sq. Ft. In Cu. Ft.	
	1.0	1.0
Multiclone	1.0	1.0
Collector A	2.1	1.8
Collector B	5.9	3.2
Collector C	6.8	3.9

## COMPARE Dollar-Saving Adaptability!

Savings in space is just one of many ways MULTICLONE reduces installation costs. Because the shape of the unit can be readily varied (long and narrow, short and wide, or square) to fit available spaces, the MULTICLONE can often be tucked into odd corners and waste areas too restricted for other equipment.

Moreover, inlet-outlet ducts can be varied—side-inlet side-outlet, or side-inlet top-outlet—to meet low headroom or restricted side clearance requirements . . . and the single-inlet single-outlet duct design permits greater flexibility and simpler installation. *These all add up to vital savings in installation costs!*



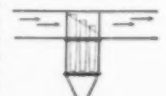
Side inlet, Side inlet,  
Side outlet Top outlet

## COMPARE All-Around Simplicity!

The MULTICLONE is simple and inexpensive to maintain because there are no high-speed moving parts to repair or replace . . . no pads or filters to clean or renew . . . nothing to choke the gas flow or increase draft losses as suspended materials are recovered. In addition, the square, flat-sided shape of the MULTICLONE and its straight inlet and outlet ducts are far simpler to install and insulate. And since the recovered material from an entire bank of tubes is collected in a single hopper, it is much easier to service and maintain than the multiple hoppers of conventional cyclone units. *Here again, the MULTICLONE saves in many ways—all of them important!*



Conventional Cyclone



Multiclone

Whether your recovery installation is in a new structure or for modernizing present equipment, you will be far ahead by installing MULTICLONE Collectors. Our experienced engineers will gladly make helpful suggestions for simplifying your recovery problems. A letter, wire or call to our nearest office places this assistance at your service without obligation.



**Send for Helpful Literature!** This factual MULTICLONE literature explains the basic principles of cyclonic dust recovery and gives technical data helpful to anyone contemplating a dust or fly ash recovery installation. Write today for your free copy!

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**GRAVER WATER CONDITIONING CO.**

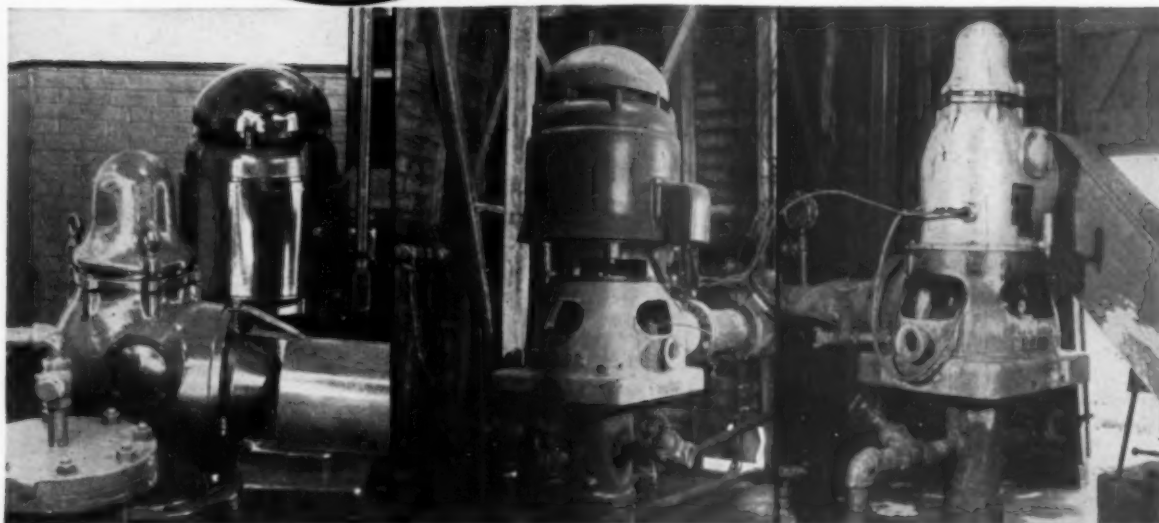
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# ON THE LINE



FOR *Fire...* FOR *Water...* FOR *Brine...*

MORTON  
SALT

"WHEN IT RAINS—IT POURS"



**HERE IS INSTALLATION VERSATILITY  
AVAILABLE ONLY WITH VERTICAL PUMPS**

MORTON SALT COMPANY, RITTMAN  
OHIO PLANT, USES PEERLESS  
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IMPORTANT PLANT DUTIES

**They supply all the water for the plant—**

**They provide approved fire protection—**

**They pump the salt wells...**

Here's what U. J. Grant, Morton Salt Rittman, Ohio Works Engineer, says about Peerless vertical pump operation costs. On the particularly tough service of pumping brine, he states, "we recently repaired an 8" deep well Peerless pumping unit installed in our No. 19 salt well. This unit was installed in 1949. The original pump bowl assembly was apparently in good condi-

tion and was put back in the well. Considering this unit is rated at 400 gpm with more than 5 years operation we are well within my estimate that upkeep costs are one cent or less per 1000 gallons of brine pumped. This cost applies to the small Peerless pumps we also use!"

Verified low Peerless maintenance costs on tough service like pumping salt wells points up how inexpensive it is to put the economical versatility of Peerless vertical pumps to work for you. Use the coupon for information about the VERTICAL VERSATILITY of Peerless industrial service pumps.

MORTON SALT KNOWS WHAT VERTICAL VERSATILITY MEANS!

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Distributors in Principal Cities.  
Consult your Telephone Directory.

Please send vertical Pump Bulletins describing

☐ FIRE PROTECTION  
(B-1500)

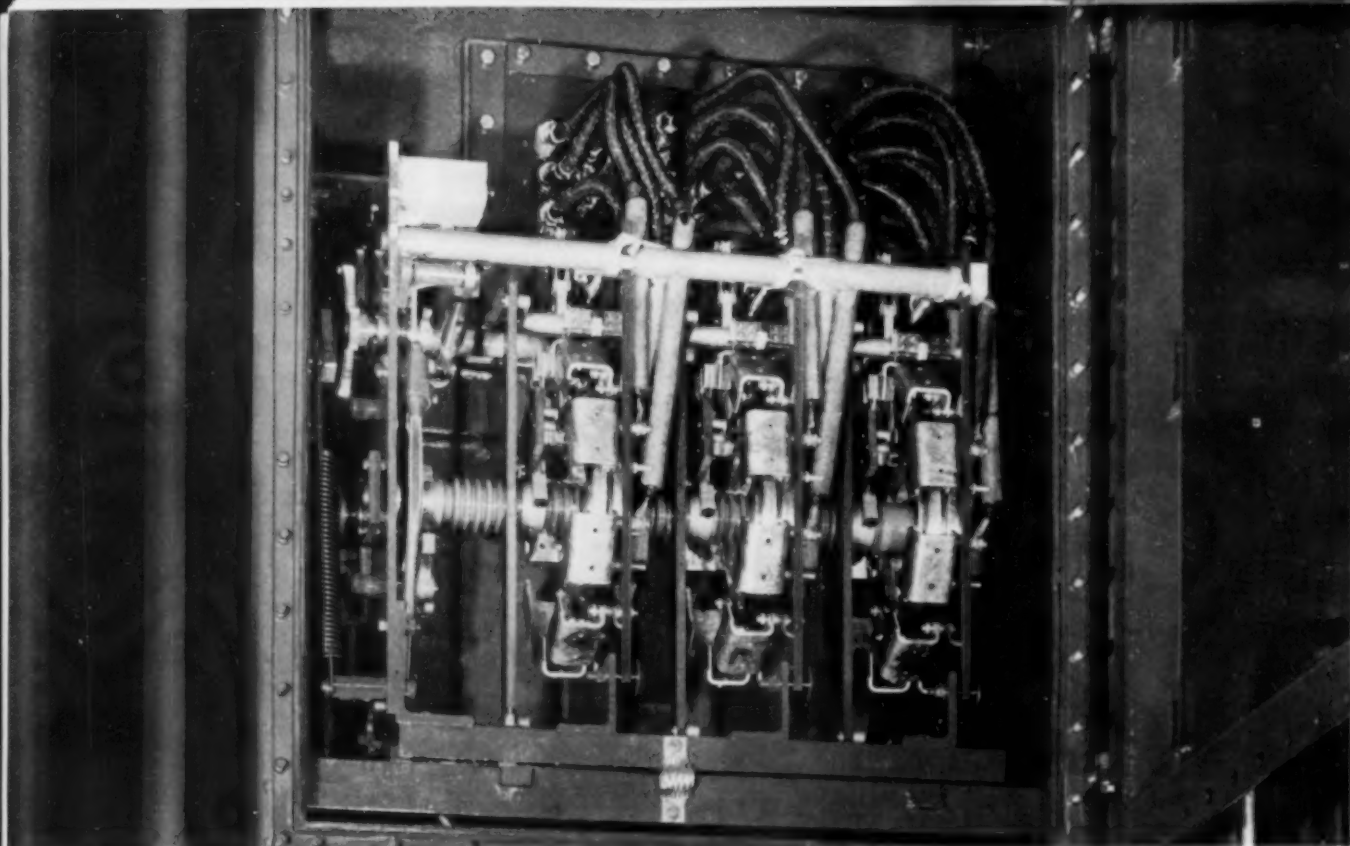
☐ INDUSTRIAL SERVICE  
(B-905)

☐ WATER SUPPLY  
(B-141)

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ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_

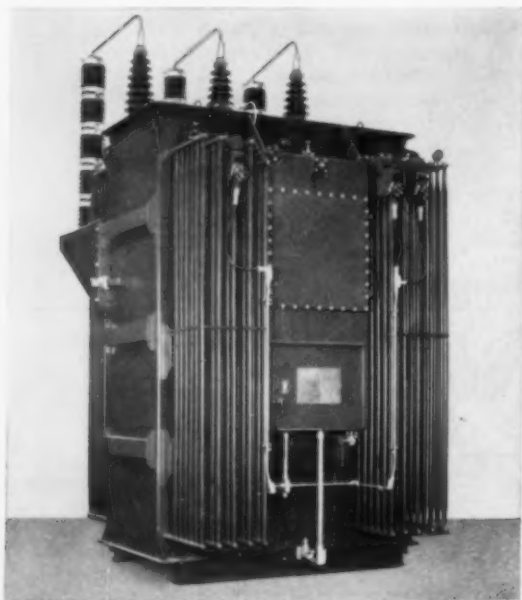
SPI



**QUIETER OPERATION.** Tap-changing switch compartment now houses motor and drive assembly completely immersed in oil to muffle noise and provide permanent lubrication. Formerly, motor plus as-

sembly was in air-filled control compartment. Mounting under oil, and redesigning of geneva gear for smooth driving-pin entry—without impact—has cut peak noise level about 20 db.

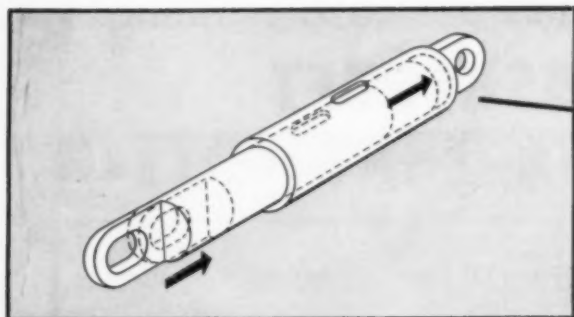
## Maintenance reduced 50% by new



**RM MEDIUM TRANSFORMERS** employ the new LRT-68 load-tap-changing switch in LTC models.

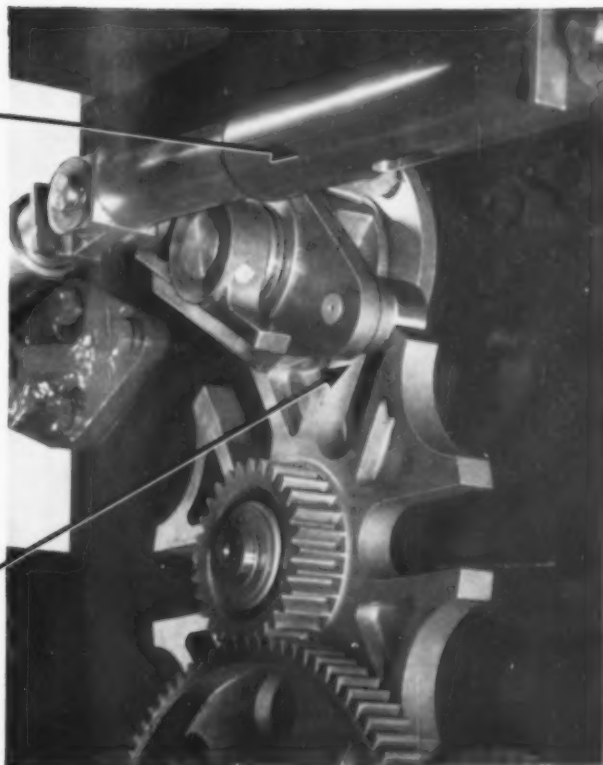
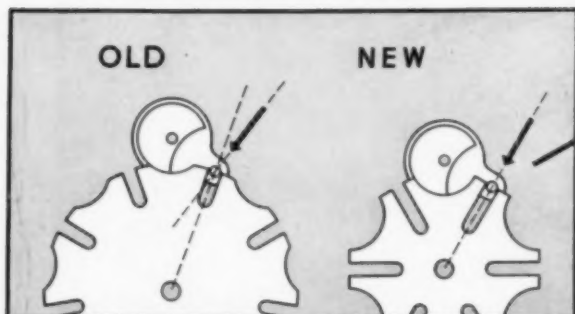


**STEP REGULATORS** up to 1000 kva will now have the added advantages of the new LRT-68 load-tap-changing switch.



**HYDRAULIC DASHPOT**

**NEW GENEVA GEAR**



**REDUCED MAINTENANCE.** LRT-68 incorporates new hydraulic dashpots and redesigned geneva gear. The two dashpots provide (1) optimum contact separation speed, and (2) reduced engagement velocity, for minimum contact erosion and less secondary arcing.

Geneva gear driving-pin now enters gear slot smoothly, parallel to the side of the slot. Previous design entered at 19° angle. Gentle acceleration and deceleration reduces jarring and mechanical wear. This, plus thicker contact tips, results in 100% increase in tip life.

# General Electric load tap changer

**Peak operating noise cut 20 db with LRT-68 switch now used on RM transformers and three-phase step regulators**

**DOUBLED CONTACT LIFE** of General Electric's new LRT-68 load-tap-changing switch means routine inspection and maintenance can be *cut in half* on G-E LTC Medium Transformers, and on three-phase step voltage regulators up to 1000 kva.

These savings have been made possible by:

- (1) reducing the amount of contact wear per operation, through redesigning the geneva gear (providing smoother operation) and adding hydraulic dashpots (for optimum separation and engagement speeds) and
- (2) using heavier, thicker contact tips, from which more material can wear before replacement is necessary.

**REDUCED OPERATING NOISE** results from a complete redesign of G.E.'s load-tap-changer. This means increased consumer good will and less investment in sound-absorbing walls and barriers, when LTC equipment is installed in residential areas.

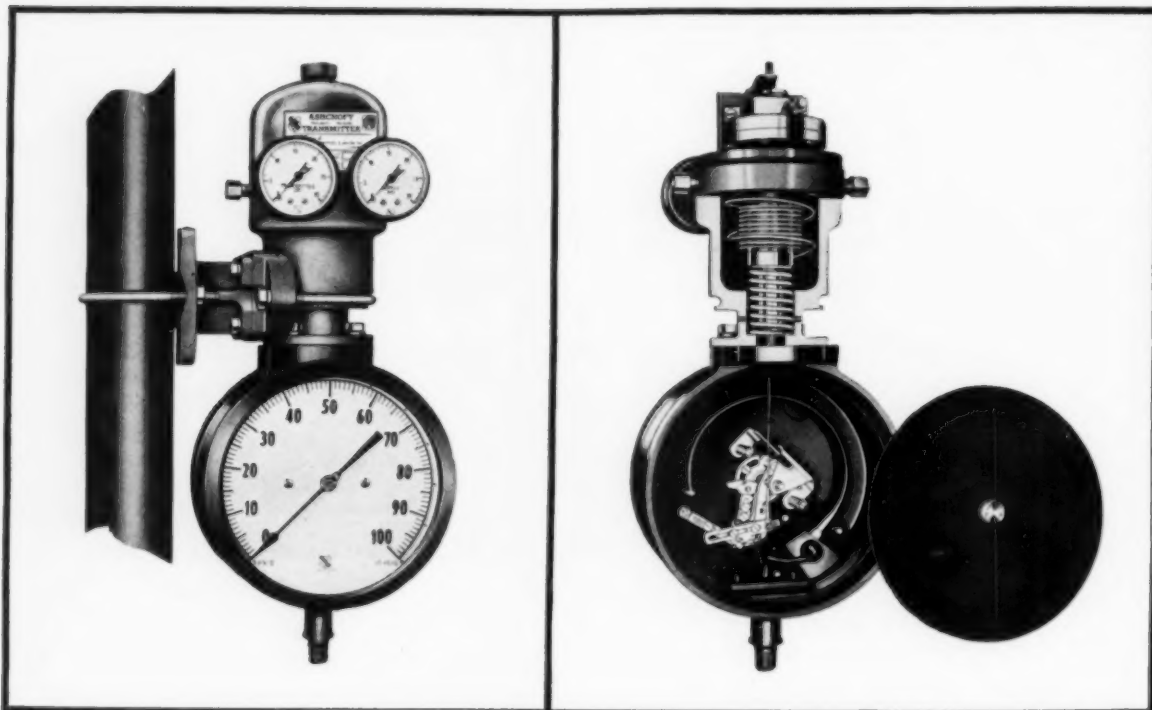
For full information on this new load-tap-changing mechanism and the medium transformers and three-phase, step voltage regulators on which it will be used, contact your nearest General Electric Apparatus Sales Office, or write Section 416-4, General Electric Company, Schenectady 5, New York.

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

*Designed to solve safety and service problems*

## ...THE NEW ASHCROFT PNEUMATIC PRESSURE TRANSMITTER



This new Ashcroft Pneumatic Pressure Transmitter is particularly recommended to processing industries and power stations. It combines speed and accuracy with maximum protection and serviceability.

The new design features the 6" indicating Ashcroft Maxi-safe Duragauge, long known for dependable performance. It has an integrally-cast solid metal wall between dial and pressure sensitive element so that the transmitter can measure pressures up to 100,000 psi with complete safety for personnel and equipment. If misapplication ruptures the Bourdon tube, the Teflon-coated back cover serves as a safety blowout relief.

Another outstanding design advantage is easy access to both gauge and transmitter sections. Simply remove the safety-relief back cover and both the gauge and transmit-

ter can be calibrated. Yet a sealed housing makes the entire assembly weatherproof.

The transmitter operates on low-pressure air. No need for expensive high-pressure lines and fittings. Supply air pressure as low as 18-20 psi for 3 to 15 psi output provides especially advantageous operation where electrical wiring might be a hazard. Inflammable, poisonous or corrosive liquids or gases are confined close to their source, away from the central control point.

The Series 1250 Ashcroft Pneumatic Pressure Transmitter is available with pressure sensing elements in all standard pressure ranges and Bourdon tube materials. Installation of the transmitter is easy. Small diameter tubing may be used, and the pipe, stem, wall or flush mounts are interchangeable in the field. Get complete operational data and construction details. Write for Bulletin 340.



**YOUR INDUSTRIAL SUPPLY DISTRIBUTOR** has the broad knowledge and thorough experience essential to satisfy every requirement of your Ashcroft Pneumatic Pressure Transmitter application. You get fast, economical service from his local stocks.

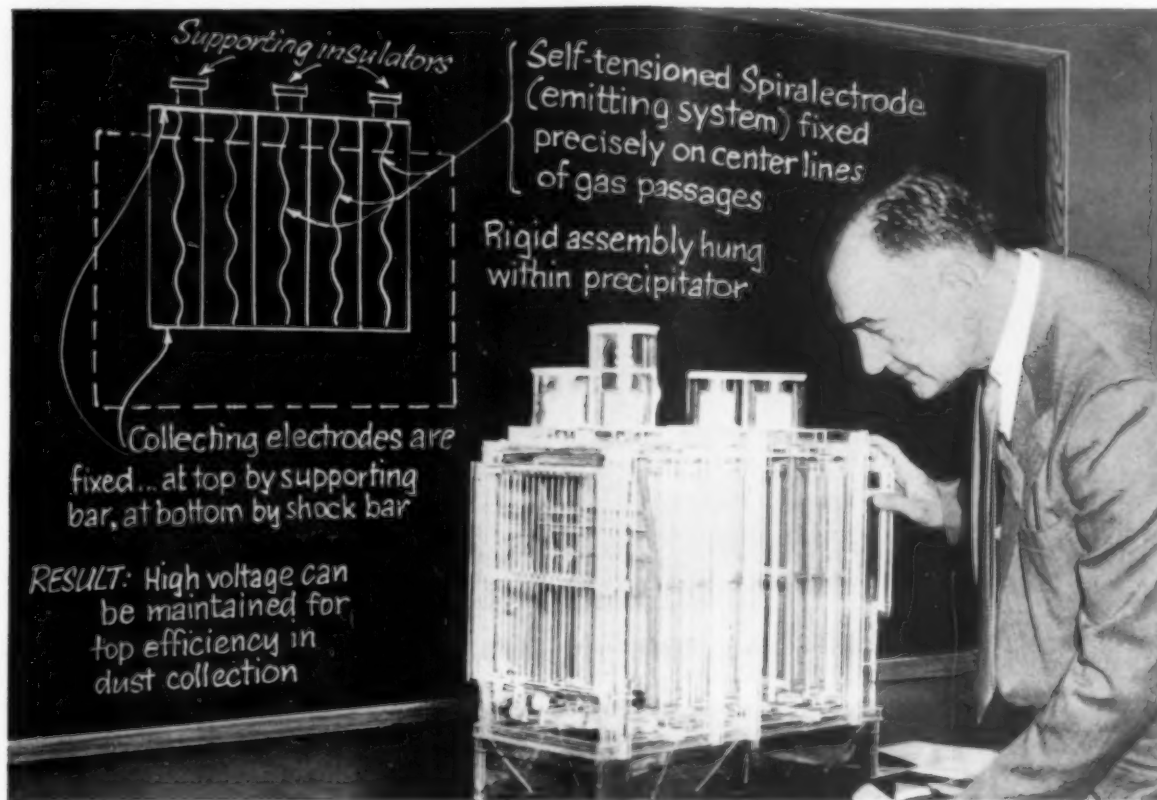
**In Canada:** Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

## ASHCROFT GAUGES

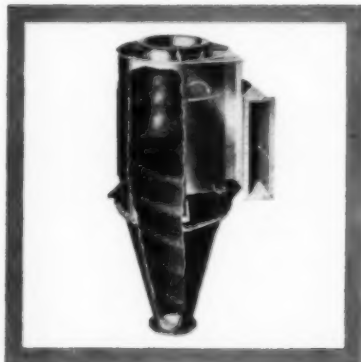
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MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Oklahoma. AIRCRAFT CONTROL PRODUCTS, Danbury & Stratford, Conn. and Inglewood, Calif. 'SHAW-BOX' AND 'LOAD LIFTER' CRANES, 'BUGDIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.



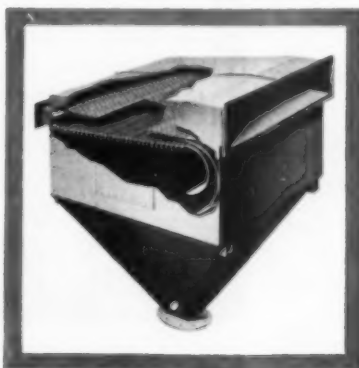
## How fixed electrodes assure top efficiency in a Buell "SF" Precipitator



PHOTOGRAPH OF BUELL PLASTIC MODEL BY INDUSTRY & POWER



Buell Cyclones also assure top efficiency with large diameter design to eliminate clogging... and by harnessing double-eddy and putting it to work.



Buell's Low Resistance Fly Ash Collector combines top efficiency to meet present strictness, with low draft loss for natural or mechanical installations.



### GET ALL THE FACTS

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Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

# CHAPMAN CHECK VALVE

TILTING DISC



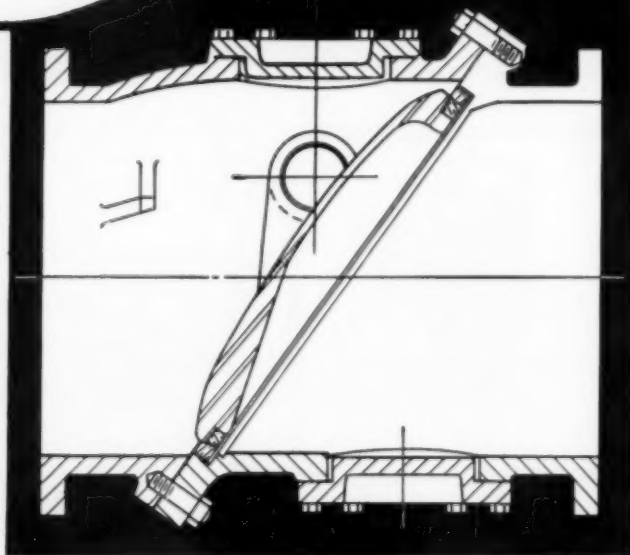
*the Valve  
with the  
Right  
Idea!*

Here is a cross section of top check valve performance at lowest cost. It's the idea in back of Chapman's Tilting Disc Check Valve . . . the valve that's designed to go with the flow.

When the flow is on, specially designed "airfoil" disc balances perfectly in open position. Fluid holds it tightly against stops. There's no vibration . . . no flutter. It's quiet. And note the design. Ample room is allowed around disc to assure low flow resistance.

When the flow is reversed, disc drops surely, quietly, *tightly* on special beveled seat. There's no banging, no slamming, no scraping or wearing of disc and seat faces, no damage to piping joints or the valve itself. It's as simple as that. It's as *sound* as that. It has the right idea.

Complete information on these rugged, quiet; long life check valves is highlighted in



our Catalog 30-A. Whether you want iron or steel construction . . . whether you handle fluids or gases under a wide range of pressures . . . this catalog gives you all the facts. Send for your up-to-date copy, today.

**The CHAPMAN VALVE Mfg. CO.**  
**INDIAN ORCHARD, MASS.**

# TIMELY COMMENTS



## "Good as New" Is Not Good Enough

**MAINTENANCE** as practiced in modern plants ties in very closely with modernization and improvements, and it is also closely related to plant expansion and production. Engineers, more than ever in the past, are giving due consideration to all plant costs in making maintenance decisions. Conclusions are based most frequently on total plant savings, rather than minimum repair and up-keep expense.

Even in making routine repairs, the old "good as new" type of thinking is not good enough. The repaired item is often much better than when new. Slight changes in design and arrangement, and use of new materials, can pay good dividends. For example, worn cutting elements may be rebuilt with harder, more durable materials, such as carbides. Wearing surfaces may be replaced with antifriction elements and provided with better lubrication.

**Maintenance tools and equipment** are also foremost in the plant engineer's thinking. This is especially true of routine maintenance equipment used for cleaning and painting. The fight against corrosion, alone, brings many new developments forward for consideration. Hand tools (traditionally resistant to change) are being revolutionized. Light powered tools are fast replacing the old hammer and saw and wrench. Not only do these tools make the maintenance job cheaper—but they enormously speed-up the work, and thereby increase production by returning machinery to service with less outage.

Much emphasis is being placed on **schedules, stockrooms and record keeping**. Certainly modern maintenance accounting methods require expense for new equipment, and frequently the clerical force must be increased. But bringing order out of chaos is a worthy goal. The important thing in this type of study is to "keep the tail from wagging the dog." Many early

efforts were bogged down in red tape. Every element of a scientific maintenance control system must be analyzed for value. Simplicity should dominate the thinking of the planners.

Nearly all of the articles sent from engineers for consideration in this (our tenth annual) maintenance issue involve **new equipment, new materials, new procedures**—or a combination of all three. There are many headings such as: New Cleaner Saves \$24.00 a Week; Carbide Tips Increase Production; Torque Wrenches Reduce Repair Frequency; Better Burner Lighting System; Device Locates Underground Piping; New Stock Room Forms; More Powerful V-Belts; New Maintenance Center; PVC Piping; Better Grout for Foundations . . . and so on.

Many of the thoughts suggested by these articles will be new to some readers. The improvements described in these case studies are all tried and proven in the respective plants. But this does not mean a reader can grab a new idea and immediately put it to work in his own plant. It may not fit his needs at all, or changes and adaptations may be necessary. Each problem demands individual attention, and merits of all changes should be thoroughly considered.

Don't expect the other man to do your work for you. But part of your work should be to **find out what the other man is doing . . . and why**. That is what the editors believe they are giving you in this issue: a round-up of maintenance activities in the South and Southwest. We sincerely believe you will find these articles thought provoking and inspiring.

**WRITE THE EDITORS FOR MORE INFORMATION ON ANY SUBJECT MENTIONED IN THIS ISSUE.**

# BORDEN

*First* IN FLOOR GRATING

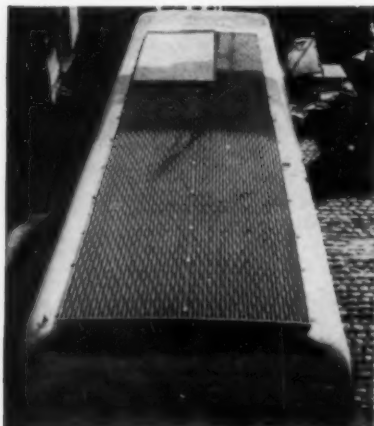
NEW USES OF GRATING . . . WHERE ONLY BORDEN QUALITY WOULD DO . . .

Here on this page are a few of the many new uses for grating being pioneered every day. Each is an exacting job where only standards of quality equal to BORDEN'S will do.

And remember . . . BORDEN manufactures every type grating in ferrous and non-ferrous metals.



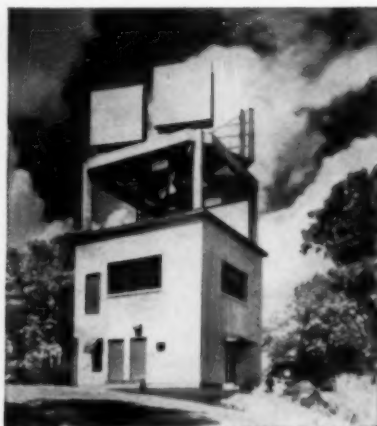
Functional beauty, low maintenance and child-proof fencing are a few of the advantages found in this *all aluminum*, pressure-locked grating.



Wherever this Color Television truck goes, whatever the assignment of the reporters who must mount its roof, BORDEN riveted serracrimp grating will mean surefooting—even in ice or snow.



Only the finest precision manufacturing would satisfy the architect who designed this door. BORDEN is recognized as a leader in quality, custom-manufactured gratings.



Television relay stations and radar stations that gird our continent have adopted grating as standard outside platform material. It will not collect snow as most other platforms will.

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# INDUSTRY SPEAKS

SOUTHERN POWER  
AND INDUSTRY



**W. J. CLAPP**

The Southeastern Electric Exchange held its annual conference at Boca Raton, Florida, March 12-14.

**W. J. CLAPP**, President of the Exchange, and President of Florida Power Corporation, speaking before public utility executives and their guests at this meeting, said in part:

**THE LAST HALF OF THE TWENTIETH CENTURY BELONGS TO THE SOUTH.** I'd like to tip my hat to the Southern Company and to the individual responsible for writing that ad—it stimulates the imagination, and adds perspective to the message we have been trying to convey to industrialists all over America.

Most companies that have moved to (or expanded in) the South have done so for sound economic reasons. Dominant among these economic reasons are raw materials native to the South — such as petroleum and wood, and stepped-up higher educational programs turning out thousands of qualified technical and professional graduates from Southern colleges and universities.

Some of the most rapidly growing industries in the nation demand ever-increasing supplies of these resources — natural as well as human. When you add to these resources the expanding consumer market — more people and people with more money in their pockets than ever before — the mighty power of this trend toward industrialization of the South becomes more apparent.

## Southern Progress

The companies comprising the Southeastern Electric Exchange have almost doubled their total installed generating capacity in the 5 years ending December 31, 1955 from 8.3 million kw on December 31, 1950 to 15.0 million kw at the beginning of this year. These same companies have budgeted construction expenditures of over 1½ billion dollars over the next three years . . . including 1956.

And there is good reason for these expenditures. Total customers served as of December 31, 1955 were 6,082,489 and we are preparing to add another 494,688 this year. Since 1940, customers have increased 155%, revenue has increased 323%, kilowatt hours increased 330%.

When figures reflecting industrial kwh sales are presented, the real strength of development of the South becomes apparent. Since 1940 industrial kwh sales have increased:

- 1,640%—Central Louisiana Electric Company
- 1,618%—Gulf Power Company
- 1,196%—Arkansas Power and Light Company
- 1,003%—Florida Power Corporation
- 980%—Florida Public Utilities
- 708%—Florida Power and Light Company
- 565%—Tampa Electric Company

Evidences of industrial development are all around us in the utility business. For example, Tampa Electric Company will be serving two new electrical equipment manufacturers with 225 new employees within a few months, and the Southland Oil refinery will add another 500 employees when they get underway soon.

The Georgia Power Company has seen 34 new and substantial manufacturers of wood and paper products establish operations since 1952—employing altogether over 2,000 employees. During the same period, over 2,600 new jobs were offered by 3 new electrical machinery and equipment manufacturers.

The Carolina Power and Light Company, during 1954 and 1955, welcomed over 40 new manufacturers in the wood and furniture industries—employing over 1,500 people; and nine electrical equipment plants employing over 2,600.

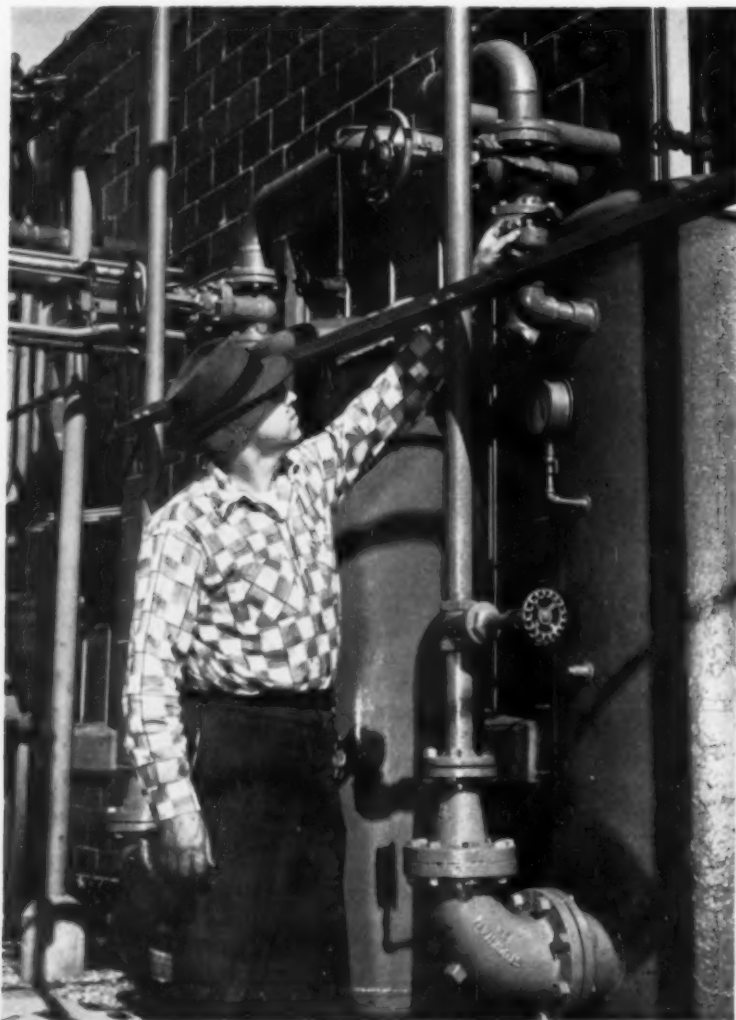
In 1955 alone, 10 new firms using wood as their basic raw material opened their doors to  
(Continued on Page 106)

# Modernizing a Plant Maintenance Program

By DODSON R. BARINEAU

Maintenance Coordinator  
Hercules Powder Company  
Hopewell, Virginia

THE AUTHOR was graduated from North Carolina State College with a B.S. degree in Mechanical Engineering. Since 1948 he has been employed by Hercules Powder Company, working primarily at the Hopewell, Virginia plant. This particular chemical plant manufactures various cellulose derivatives and has allied acid and solvent manufacturing processes. The positions he has held include: Project Engineer, Area Maintenance Supervisor, and Maintenance Coordinator. He was the engineer assigned to the maintenance research job referred to in this article.



IN RECENT YEARS numerous articles have been published on various types of Preventive Maintenance programs, Record Systems, Job Scheduling, etc. These articles have usually described how a specific program suited the needs of a particular plant but not how that program was selected.

The problem facing any size plant desiring to lower costs by using the most recently developed maintenance procedures is four-fold. These four parts are:

1. Tailoring suitable types of systems to form a complete program for present and future plant needs.
2. Integrating new methods with existing ones, avoiding duplications or omissions.
3. Obtaining the co-operation of supervisors and foremen of both maintenance and operations.
4. Selling the complete program to management and justifying the expense of each phase.

## Methods studied

Three techniques of attacking this four-fold problem were considered when the Hopewell, Virginia plant of Hercules Powder Company reviewed its maintenance program two years ago.

The first technique is too familiar to all of us. It could be called the "fire-fighting" method. When frequent breakdowns or high costs force the issue, a maintenance engineer already overburdened with details selects or devises a new group of records or some other gimmick to ease his immediate problems. Without sufficient time to work out details, his new gimmick will probably not answer all four points of the problem.

The Preventive Maintenance Inspector makes a routine check of a safety relief valve on an air receiver.



These five files hold all record and inspection cards for 3,700 items of equipment

The second technique considered was hiring a consulting firm to recommend a complete program. There are a number of such firms that can work out the details of an integrated program much quicker than plant personnel could do so, but there are disadvantages to this method also. Any consultant must charge a rather large fee to cover his becoming familiar with the plant, equipment, etc., as well as working out a maintenance program. Also, modifications to any system are inevitable and the plant personnel making any subsequent changes will not know the background material used in developing the original program.

No matter how excellent he may be, one other disadvantage cannot be overcome by any consultant. His time for becoming well acquainted with the plant personnel is limited, so he cannot fully utilize the valuable experience of the maintenance foremen, supervisors, etc. Also, since the new program is not a result of their ideas, these foremen are not likely to strive to make it work. All of us have seen the pride of a foreman describing how he proved "the expert" wrong, so we have an indication of the battle any program will face if thrust upon a department.

The third technique considered was the one used by our Hopewell plant with apparent success. This technique could be called a "local consultant" method. It is really quite simple, merely using routine research procedures for maintenance.

#### Research Job

An engineer familiar with the entire plant and experienced with the existing maintenance methods and problems was given this maintenance research job. He was relieved of routine maintenance duties to prevent daily problems from overshadowing his new assignment. The specific assignment was: (1) To investigate the Preventive Maintenance programs and other programs being used by other plants (2) To consult with all engineers, foremen, etc., whose advice might be useful, and (3) To make recommendations as to changes in a formal report.

A file of trade journals containing articles on Maintenance Programs had been collected over several years, so the search for reference material was fairly simple. The plant which has not subscribed to many magazines or has not saved the issues can usually get copies of pertinent articles from

the publishers for a period after publication. The index to these articles may be found in the Industrial Arts Index in libraries of large cities and colleges. Also, the Technical Societies will furnish copies of papers on specific subjects that have been presented at their meetings.

Additional information was obtained from bulletins on Preventive Maintenance, Maintenance Records, etc., published by several different companies including General Electric and Remington Rand. Salesmen of records equipment can usually furnish ideas as to sources of other material.

Information and technical assistance on setting up lubrication standards and procedures can be obtained from almost all the major oil companies. This portion of any program requires review fairly often as new equipment is added, new lubricants developed, or as new men are assigned to lubrication. Our investigation disclosed that a unit was being lubricated too often in one area while a similar unit in another area got marginal attention.

Reading about other plants' programs is of course useful, but the value of actually visiting other plants cannot be overemphasized.

Watching a different method in operation while discussing its good and bad points is quite revealing. Hercules has a number of plants so this portion was made considerably easier. Another plant similar to Hopewell instituted a new program approximately a year before, so the merits and disadvantages of their system were studied.

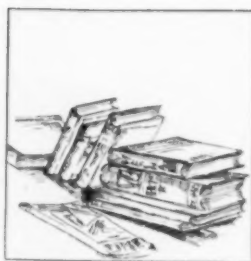
For the company which does not have several plants that can interchange information, the problem is larger but not unsurmountable. Since maintenance is a universal problem, swapping visits with similar plants should be easy to arrange through contacts in local technical societies, management associations, or chambers of commerce.

#### Area To Be Covered

After assimilating information on the different systems used by other plants the next logical step for the investigating engineer was to make an outline of the area to be covered by his recommendations. Even the portions of the program which were expected to remain practically unchanged were included. Changing one phase of the total program will inevitably affect the others in some manner.

The outline for the Hopewell plant report was somewhat as follows:

- I. Maintenance Organization
  - A. Responsibilities
  - B. Work Order Procedure
  - C. Clerical Methods and Reports
- II. Preventive Maintenance
  - A. Records
  - B. Lubrication
  - C. Inspection
  - D. Analysis
  - E. Material and Labor Requirements (to institute and maintain program)
- III. Maintenance Material Control
  - A. Store Room (not including accounting and purchasing methods)
  - B. Materials Handling
  - C. Salvage Reclamation
- IV. Planning and Scheduling
  - A. Present Maintenance Organization
  - B. For Future Maintenance Organization



#### EDITOR'S NOTE

Maintenance planning like all other engineering involves thorough study of available technical literature on the subject. Most recent information on new products and equipment is to be found in manufacturers' news releases and bulletins. This issue of SP&I carries extensive sections presenting current releases on products applicable in the industrial maintenance field.

... See Contents page 3 ...

#### Filling in Details

The main body of the problem follows the outline, that is, filling in the details. From this point on, engineers, foremen, clerks and other personnel should be consulted for ideas. Their experience will prove valuable and their later cooperation is essential.

Not all of the recommended changes will be adopted at once and some program phases will not be changed at all. However, it is necessary to cover all details in order to avoid duplications and omissions. It is while working out details that fallacies of systems are exposed, before it is too late.

Judging the merits of a proposed method or record includes two questions. First, does the method or record require the least possible effort and expense to accomplish its purpose? Second, does the potential savings justify the cost of the item? Many records are kept where the clerical cost is all that is considered while the time of the mechanics, foreman, etc., relative to the records is forgotten.

An example of unnecessary procedure which we found was the requirement that all maintenance stores tickets be signed by a foreman. The doubtful control of ma-

terials was more than offset by time wasted in obtaining signatures. A simple revision here resulted in several other benefits also.

The largest single pitfall when writing the details of a program is stating that something shall be done without specifying who is to do it. The programs from all of the numerous plants we checked provided some means for recording a great deal of data "to be studied." In almost no case was there a provision for someone, both qualified and with adequate time, to study the data and make definite recommendations.

#### Formal Report

To sell the proposed changes to management, a formal report suitably outlined and documented, was submitted. Each portion of the total program was supported by brief remarks, such as how similar plants used the same item. A bibliography showed the main sources of information which were used and the appendix included copies of the more pertinent articles.

To conserve management's time a synopsis of the main points including the expected costs and savings was inserted at the beginning of the report.

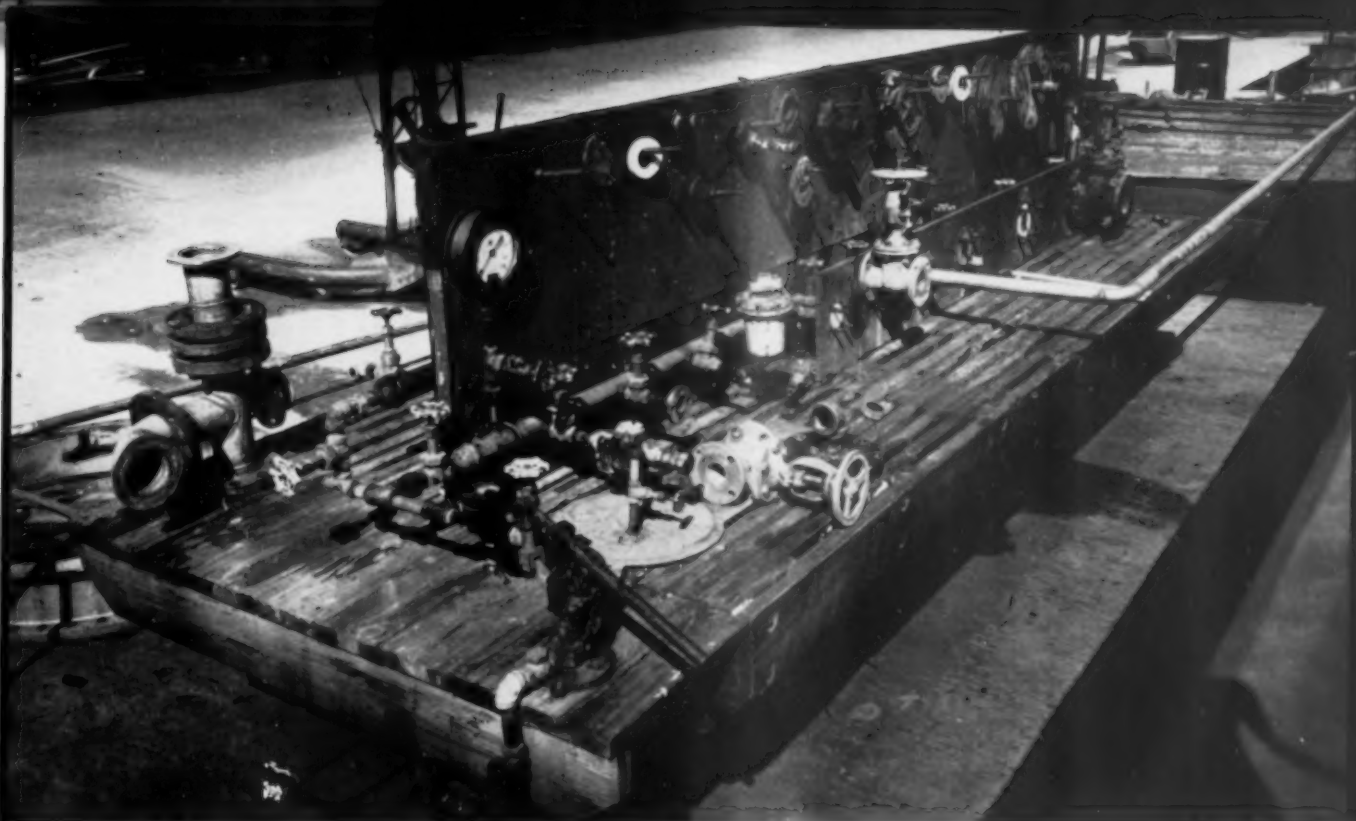
#### Continuing Program

More changes were proposed than could be undertaken simultaneously, due to budgetary and manpower requirements. The report therefore suggested various sections as needed immediately and several others to commence in a year. Other sections were to be undertaken when the maintenance force reached specific levels.

Most of the recommendations in the Hopewell report have been put in operation, with gratifying results. Modifications and alterations have naturally been necessary as situations have changed, but the basic outline will probably not need another "modernization" for some years to come.

The methods described in this report were used in a chemical plant having about 150 maintenance employees. The basic technique, however, appears applicable to any type or size of plant.





## Test Table Duplicates Working Conditions

**IN THE** various operations of our plant, we use steam at three pressures, 50 lb for process and general heating, 150 lb for process, and 600 lb as a prime mover. We perform our own maintenance and test our repaired traps and valves on a very convenient table designed by our Pipe Foreman, Mr. Dave Belcher.

On this table we actually test valves, traps, shop fabricated fittings, welded pipe joints, etc., under the designed pressures they are to serve whether it be for steam water or air service.

The working surface of this table consists of treated 2" x 8"s on edge with open spaces between to allow rust scale, debris, and water to drain through. It is very heavily built for it receives exceedingly rough treatment and at times supports heavy loads.

The table might be of most any reasonable size, but we have found that our present table 5' x 16' is sufficient. Dividing the working sur-

**By B. A. MORGAN, JR.**

Maintenance Engineer  
Celriver Plant  
Celanese Corporation of America  
Rock Hill, South Carolina

face in half we erected a 3' high, metal covered wooden partition down the middle of its length. This partition provides racks for various size flanges, gaskets, and other equipment as well as acting as a protective screen to men working opposite each other. About 8" in front of this partition, a ½" thick steel plate is erected for the purpose of attaching bolts to fit the various size valves and trap bolt circles. A duplicate plate is also arranged on the opposite side of the partition to complete the accommodation of the full range of sizes.

Behind each plate is a 2" pipe header which is connected through valves to the center of each bolt ring. Through this one header, steam, air or water can be routed

at various pressures to the equipment being tested.

The accompanying picture illustrates several valves and a trap in the testing positions as well as a long piece of fabricated pipe which has been placed for testing the welded fittings.

The header is so valved that a workman can use steam on one side of the table and water on the other side, or even steam at one end and water at the other end at the same time.

We have also mounted a hand operated pump as shown in the picture to build up any amount of water pressure desired.

This table is mounted in the open on a concrete slab just outside our pipe shop and although a shed overhead would be a desirable feature, we strongly recommend the outdoor location for disposing of excess steam vapor, drainage water, etc. A gage is mounted on the partition to serve as a positive check on pressures in actual use.



Rough Mill Department in a Drexel plant. The hydraulic cut-off saws in the foreground and the row of straight line saws in the background are carbide-tipped.

## *North Carolina — Close Relationship between Maintenance and Production*

# How Carbide Tools Cut Costs

**TUNGSTEN CARBIDE** manufacturers, as well as producers of wood-cutting tools employing tungsten carbide cutting edges, have been emphasizing the production and maintenance advantages of carbide tools in the woodworking industry. Drexel Furniture Company—of Drexel, Morganton, and Marion, North Carolina — has been thoroughly sold for some time.

Over seven years ago Drexel began using a few carbide-tipped cut-off and rip saws and has gradually expanded to a program that uses carbide on every wood-cutting machine except the band saws. It is certainly safe to say that as soon as a practical method of using carbide on the band saw is developed, Drexel will be one of the first to try it.

This does not mean that after

**By L. S. INSCOE, JR.**

*Drexel Furniture Company*

trying one carbide saw Drexel went all out and spent the thousands of dollars that it now has invested in carbide tools and grinding equipment, but it means that they have tried carbide tools for various jobs, gradually learning more about their capabilities and limitations and applying this knowledge to other jobs.

### **Rough Mill**

By far the most common use of carbide tools at Drexel is the cut-off and rip saws of the rough mill departments. Every saw now used in the seven rough mills of Drexel is a carbide-tipped saw.

It would be impossible to cut the tremendous volume of lumber that is required to keep the plants rolling if we went back to carbon steel saws and retained the same equipment, personnel, and hours that we now use.

When used continuously, as our saws are, carbon saws had to be filed from twice a day to once every two days, depending on the kind of lumber being cut. Although we try to have all our carbide-tipped saws ground at least once every two months and preferably once a month, some have been used for much longer periods with no ill effects.

Not only do we maintain maximum production in our rough mills by using carbide-tipped saws but they also produce such a quality joint on our rip saws that we have

eliminated the use of the glue jointer. The core stock goes directly from the rip saw to the electronic core presses.

### Moulders

In addition to the saws in the rough mills, we also are using a large number of carbide cutting tools on the moulders. Because we have to make hundreds of different items on our moulders, some for very short runs and some for one cutting only, we have not found it practical to convert completely to carbide moulder cutters. However, for straight cuts and special cuts that are run repeatedly, we have turned to carbide cutters.

We use several types of carbide cutters on the moulders including helical carbide knives cast into an aluminum head, solid carbide knives in the conventional moulder heads, carbide inserts brazed to steel knives that are used in the conventional heads, and solid steel heads with carbide inserts brazed on.

The obvious advantages of the carbide knives on the moulder are the grinding time saved and the more accurate machining due to the better retention of knife shape because of the small amount that is ground off during sharpening.

### Planer Blades

The newest carbide tool introduced to our rough mills is the solid carbide planer blade. These blades are made of solid tungsten carbide, 1 1/4" wide, 5/32" thick and any length necessary up to 50".

One company makes these knives in one solid piece by the use of hydrostatic pressure while another company makes the knives by fusing together 10-inch segments. Drexel is now trying out knives of both types and is well pleased with the results. We find that these knives will run over twenty times longer than steel knives before grinding is necessary.

One thing that causes the general woodworking industry to be skeptical of the carbide planer

knives is that quite often a foreign article such as a steel bullet, nail, or barbed wire that has grown into a piece of wood is not discovered until the wood is sawed or planed. Since carbide is so hard and brittle, it is believed that a nail that goes through the planer would break the knives that are turning at 3600 rpm.

It has been proved that the carbide planer blade will cut the nail or bullet with no ill effect to the knives as long as the foreign object is held securely by the wood. Even if a place should be broken from a knife by a loose object, the entire knife is not lost. A new segment may be fused to the undamaged portion.

### Finish Machines

In the finish machine room we use a large number of carbide-tipped saws on the variety saw, double-end miter saws, panel sizer and tenon machine. We have not converted altogether to carbide on these machines because there are still some jobs that we find can be done better with carbon steel saws.

Carbide router bits and special router cutters have been found very valuable in the finish machine room. We have never found, however, that small router bits (under 1/4") are very practical because of the brittleness of the carbide, but larger size bits work very well.

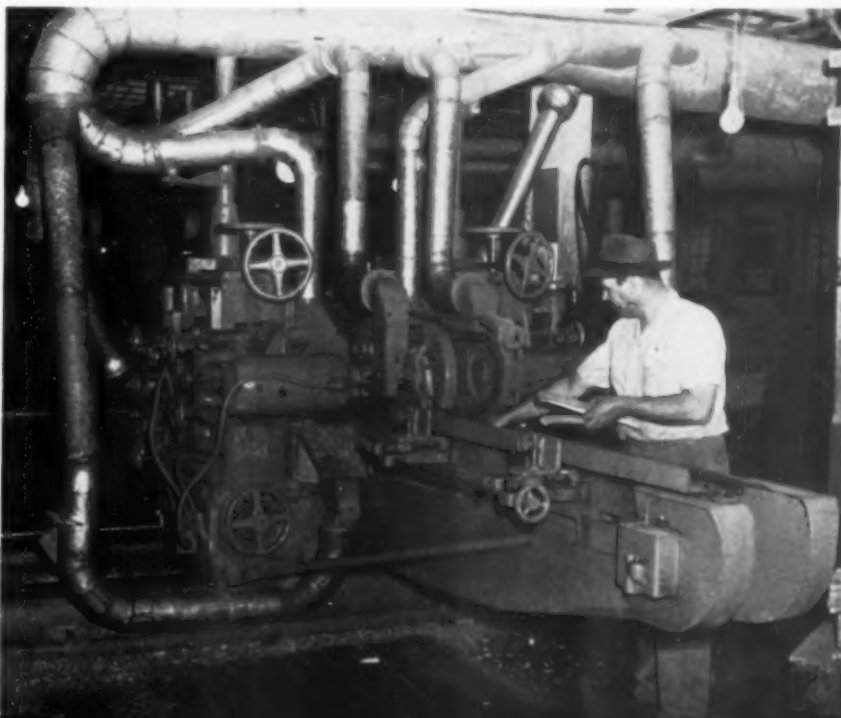
In recent years we have had experience cutting plastic laminates. We have found that this substance cannot be cut efficiently with ordinary high speed steel cutters and have had to turn to carbide for this job. In addition to the carbide shaper knives we have for cutting plastic laminates, we have other carbide shaper knives and heads for standard shapes.

Here as on the moulder, we not only save grinding time but we are also able to maintain the original contours more accurately.

Perhaps the greatest single use we have found for carbide tools outside of the rough mill saws are the special groove saws for the shaper. Instead of using adjustable steel groove saws that require time to adjust, we have carbide groove saws for all of our standard size grooves. We keep the sides of the tips of these knives straight from top to bottom and grind clearance on the edge of the tooth. Then by grinding the saw on the periphery, we maintain the correct size of groove throughout the life of the saw.

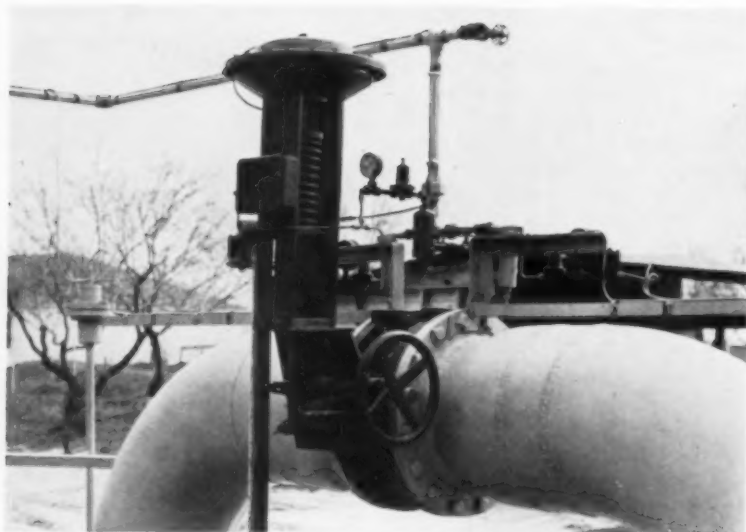
### More Uses

It is certain that Drexel Furniture Company is sold on the use of carbide wood-cutting tools and that they will continue to find more uses for this amazing powdered metal.



Tenon machine in a Drexel plant using carbide-tipped trim saws.

# Make Actuators Do Their Job Right



*Courtesy Taylor Instrument Companies*

Fig. 1. Diaphragm actuator used to position a butterfly valve

**IMPORTANCE** of the actuator is at last being recognized after years of obscurity in the control system. Very possibly this subject has been neglected because we all have piston and diaphragm actuators stuck away in inaccessible corners doing their job day after day without attention. Present day recognition of this importance follows realization that no matter how refined the controller may be or how expertly the valve, pump or damper may be selected for the service, the control system is inadequate if the actuator does not perform properly.

The term actuator is applied to any device whether electrical, hydraulic or pneumatic which may be connected to a valve or other flow control element so that the output of a controller may be employed to position the element. Due to the wide variety of types of actuators and also the prevalence of pneumatic diaphragm and piston actuators, these two types are the subject of these remarks.

Many of us feel that adequate

preventive maintenance would preclude emergencies. Although this discussion somewhat assumes that the work would be done during a predetermined shut-down, the same check lists may be used when unexpected deviations from normal control occur.

It is quite logical to consider selection and maintenance of the actuator separately as a unit because each type may be adapted for use on so many different pieces of equipment which vary flow.

## Air Distribution System

Although it may seem irrelevant, the first place to inspect when erratic operation of an actuator occurs, is the air distribution system. Blowing out the lines, bleed points and drips may bring temporary relief; but evidence of too much moisture means inadequate cooling and de-humidifying or sags on distribution lines. It takes very little accumulation of moisture to cause sufficient pressure variations in air supply to an instrument to upset control. The same affect can occur

By **CHESTER S. BEARD**

Research and Development Engineer  
Foster Engineering Company

in the line between the instrument and the actuator.

## Diaphragm Actuators

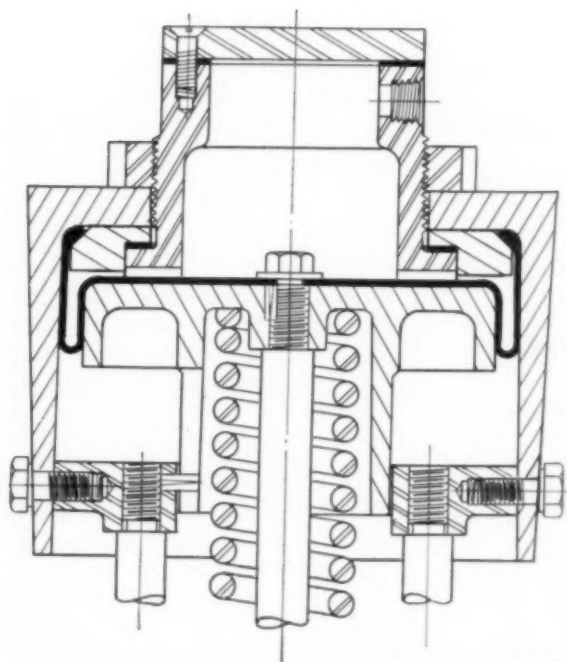
Spring-loaded diaphragm actuators (Fig. 1) are by far the most common in process and industry. Although there are innumerable varieties of design, they all must contain certain basic parts. These are the diaphragm, diaphragm case, diaphragm plate or button, spring, spring adjustment, stem and yoke.

Correct positioning of the stem in direct relation to the output pressure of the controller requires a leak-free diaphragm case. The volume of air which may be supplied by the controller to create pressure in the case is very small. Any leakage in excess to this output will not allow the correct pressure to be applied to the diaphragm. The case should be soaped before dismantling to evaluate leakage if any.

The top of the case must be removed to inspect the diaphragm and stem connection. In many actuators the stem is connected to the button with a nut through the button. This nut must be tight. If any one part is more important than another, the diaphragm would seem to be the most important. It should be inspected carefully for wear or breaks. Molding or laminating diaphragms have increased their life to the point where replacement becomes rare.

Even evidence of chemical reaction has been decreased by use of synthetic rubbers. The importance of the diaphragm and its relatively low cost make it advisable to use a





Courtesy Foster Engineering Co.

Fig. 2. Small convolution diaphragm is used to obtain piston action while retaining frictionless seal.

new diaphragm if there is any possibility of failure before the next shut-down. Many diaphragms have a bead or shaped edge which must be retained according to the design to take advantage of its variations.

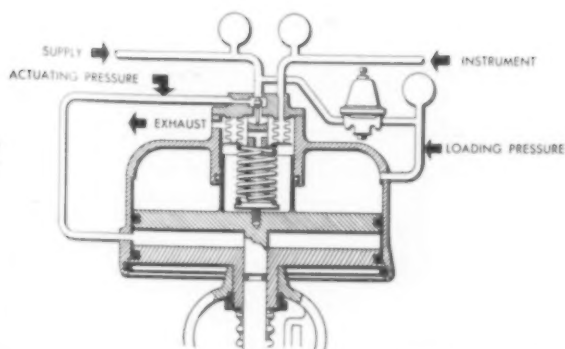
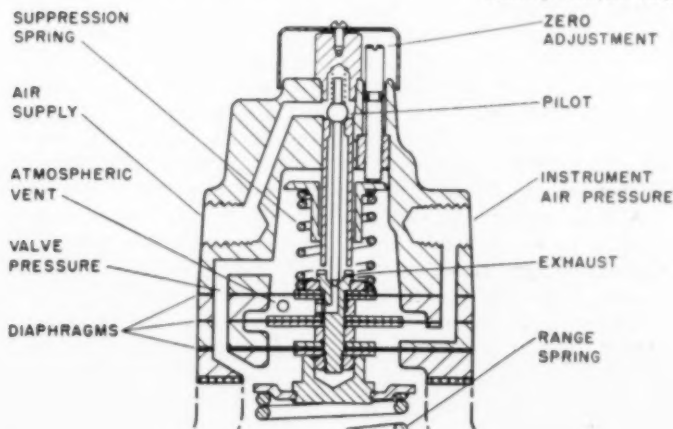
Springs would seem to be a vulnerable part of an actuator; but as far as the author can determine, no failure of a spring which has past initial inspection has been reported. The important feature to be

checked is the pre-load setting of the spring. Pre-load is the pressure required on the diaphragm to cause initial movement of the stem.

Precise setting can only be made by use of a dial gauge to detect initial movement and a mercury manometer to determine the pressure applied to the diaphragm. This accuracy usually is not required particularly when a positioner is used. Very close setting may be ob-

Fig. 4. Stem position may be sensed by compression of a calibrated range spring.

Courtesy Conoflow Corp.



Courtesy The Annin Co.

Fig. 3. Spring is replaced by a loading pressure. Valve positioner controls pressure to top of diaphragm.

tained using a good low pressure gauge and sensing initial movement by hand.

### Diaphragm Piston Actuator

Full advantage has been taken of a diaphragm as a frictionless seal for the motivating pressure (Fig. 2) while retaining the constant force output of a piston. As this is a variation of the diaphragm actuator, the same features must be checked. Leakage is most likely to occur if the locknut on the adaptor piece in the center of the top of the case is not tight. The figure shows that the small convolution diaphragm is held in place by the chamfer of a plate which locks a bead on the diaphragm into the case.

### Cylinder Actuator

In addition to external leaks the cylinder actuator is susceptible to leakage past the piston. An extremely smooth inside surface of the cylinder is required to minimize friction and wear on the rings. Manufacturers of pneumatic cylinder actuators for use on control systems have refined the methods of honing and polishing this surface to less than 5 micro-inches.

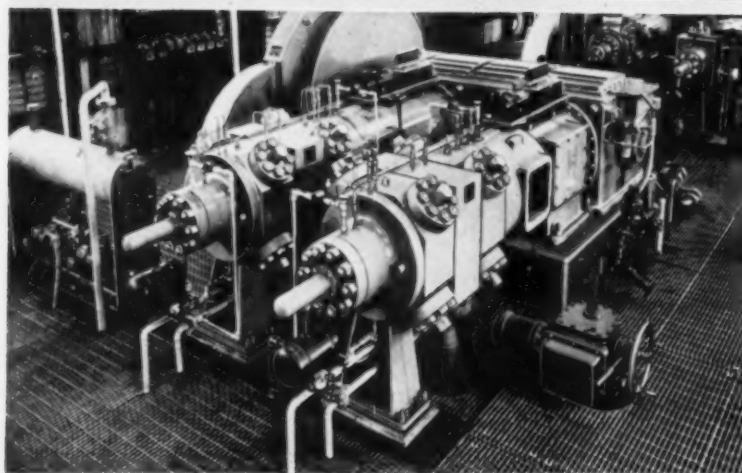
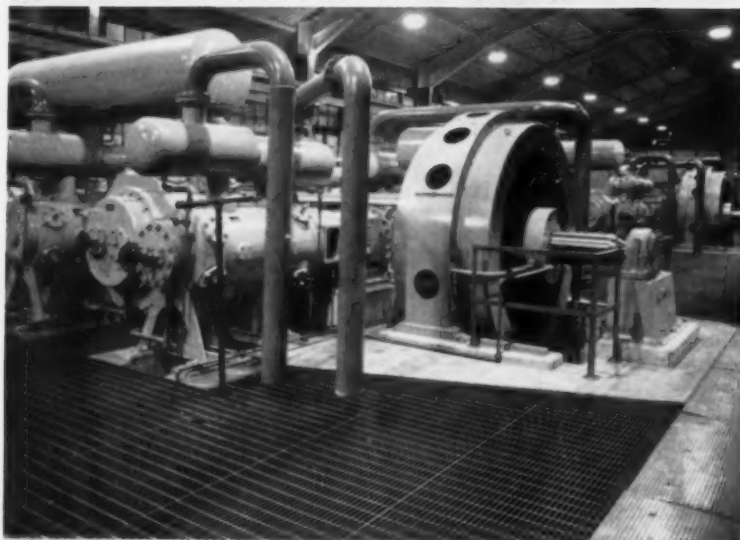
Excessive wear on rings can only occur if this finish has become rough. This may occur from foreign matter carried into the cylinder by contaminated air or carelessness upon reassembly after an inspection. Rings are in the same category as diaphragms when replacement is considered. Any evidence of wear or imperfection warrants

(Continued on Page 102)





## Steel Grating for Safety and Low Maintenance



**GRATING**, or open steel flooring, contribute both to safety and low maintenance. Its open area improves circulation of light and air, and because of its self cleaning properties, it won't collect dirt, oil, grease, or snow. Its high strength weight ratio often means less supports than other types of floors.

Grating is also easy to install and can be put into use immediately. It is easily fabricated to provide for openings for columns, pipes, etc., and is frequently used to provide easy access to heavy equipment which needs frequent servicing or inspection. In boiler rooms and other hot areas, as well as in dust or gas-ridden parts of the plant, grating's open construction helps heat, dust and fumes to escape, thus keeping workers more comfortable and efficient.

Illustrated are several grating installations of Kerrigan Iron Works, Inc., Nashville, Tennessee. This Weldforged grating has continuous spiral transverse bars that rise slightly above the bearing bars (and alternate right and left) to provide excellent safety underfoot. Its Bonderized treatment assures corrosion control and provides positive paint adhesion for longer life.

A new product for the chemical, oil and packing industries is stainless steel grating. Also, aluminum spark-proof and rust proof grating is now being manufactured.

**UPPER** — Grating installation of Alabama Power Company, on fan floor.

**CENTER** — Safety afoot here in the compressor house of the Grace Chemical Company plant in Memphis, Tennessee.

**LOWER** — Grating installation in The Atlantic Refining Company's new ammonia synthesis plant assures safe walking around machinery.



## Daily Maintenance Eliminated By Better Tightening Procedure

A SOUTH CAROLINA oil mill company uses D.10

Expellers to separate cotton seed oil from the cotton seeds. There are eighteen 1 3/4" clamping bar cap screws holding the two halves of the barrel together on each machine. The machine manufacturer recommends that 3 men tighten these cap screws with a 10 ft bar after every 24 hours of operation.

Since the company has four machines, that meant a daily tightening job on 72 nuts. In addition, the barrel has to be opened to clean the inside of the machine about 8 times a year. Also, in case of a breakdown or power failure, it is imperative to open the barrel very fast to clean it out before the residue hardens and makes the job difficult.

With an Ingersoll-Rand Size 577 air-operated Impactool, the company found it did not have to tighten the cap screws every twenty-four hours because the tool tightened them sufficiently so that vibration wouldn't loosen them. Also, two men can



Tightening large cap screws on impeller housing

easily dismantle the machine with the Impactool in case of a breakdown, and the job is safer and takes less time. In fact, the tool has been so satisfactory that another one has been purchased for similar service at another plant.

## Louisiana Plant Stops Rust by Spraying Enclosures with Crystals

VPI CRYSTALS, a highly effective rust inhibitor used in bulk by industry, is now available to the small-quantity consumer. The material is being packaged in small containers by the Al-Con Chemical Company, New Orleans, Louisiana. Sold in either 2-oz shaker bags, or 4-oz polyethylene spray bottles, the rust inhibitor is easily applied to any metal surface which is to be kept free from corrosion. VPI is a trade mark of Shell Oil Company.

The bagged crystals (trade-named V-B-i) and the bottled spray powder (called R-i-P) have already found wide acceptance for protecting tools, instruments, and all types of stored or enveloped metal.

Presently, the biggest user of R-i-P is a large Louisiana plant which has thousands of tools, gauges, and various other items stored in bins and cabinets. It was decided to use VPI to protect these items, but applying the crystals presented a problem because spray equipment could not be easily moved to so many different locations.

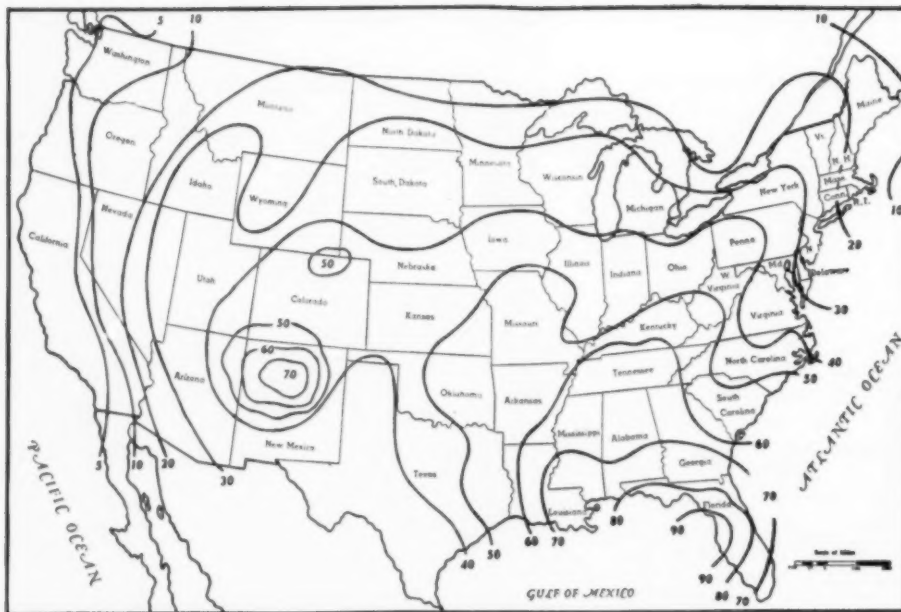
The use of R-i-P in plastic spray units was the solution to the problem because every department was given a supply of R-i-P bottles and the various cabinets and bins could be sprayed very quickly once a week, or as necessary. The biggest advantage of R-i-P bottles is that no special spray equipment is necessary, and the VPI is dispersed uniformly, eliminating waste and overuse.

The same plant also uses R-i-P bottles to periodi-



VPI is being sprayed into a tool cabinet. Small bags of the same material help maintain protection in the closed space.

cally spray recording and controlling instruments, electrical switch gear and control panels.



20 YEAR survey by the Government was charted by the National Bureau of Standards. Chart reproduced by St. Louis Lightning Protection Co., courtesy N.B.S.

AVERAGE NUMBER of thunderstorms in various parts of the country. Tampa, Florida, has an average of 94 a year, far ahead of any other section. Santa Fe, New Mexico, is second with 73. However, thunderstorms do not operate on a fixed schedule, and havoc-raising disturbances can occur almost any time throughout the summer.

## Lightning Protection

By M. S. ROSENTHAL

Division Manager, Chimney Engineering Service  
Div. of St. Louis Lightning Protection Co.  
St. Louis, Missouri

**THE MENACE** of lightning is closely correlated to that part of the country where we reside. The range for lightning storms is from less than 5 per year on the West Coast to as many as 94 in the vicinity of Tampa, Florida.

While there is not much we can do to prevent lightning storms, there is much that can be accomplished toward harnessing and controlling this phenomenon. Recent advances in the field of lightning protection have provided us with the necessary tools.

Estimates show that lightning losses in the U. S. average \$100,000,000 annually and this does not begin to take into consideration the extra added millions never again recovered because of restricted and

lost production in industrial plants. Wherever the strong possibility of lightning exists, alert engineers are providing for the installation of approved lightning protection systems.

### Adequate System

There is a decided difference between a lightning protection system and an approved lightning protection system. Qualified manufacturers and installers of lightning protection materials are guided by specifications prepared by such authorities as the National Bureau of Standards, Factory Mutual Association, National Fire Protection Association, Factory Insurance Association, and the Underwriters Laboratories, Incorporated. If you

have lightning protection and you are in doubts as to its adequacy, there are many qualified installers throughout the country who will be happy to make cost free surveys.

### Check Chimneys

Practically all heavy duty smoke stacks are equipped with lightning protection systems because of the obvious lightning hazard due to the height of these structures. In too many cases, however, industrial owners are expending sizeable amounts for chimney repairs which can be eliminated, to a great extent, by bringing the lightning protection system "up to specs." If you have a lightning protection system on your heavy duty chimney why not check it for these common type of deficiencies and inadequacies:

- (1) Are the lightning protection system materials of copper and of approved weight and size?
- (2) Does your chimney have at least 2 down conductors and at least 2 separate grounds?

(Continued on next page)

(3) Are the air terminals (lightning rods) of a solid copper or other approved material and do these air terminals extend at least 30 inches above the top of the chimney to prevent so called lightning flickers?

(4) Has provision been made to encase all the lightning protection materials in the top 25 feet of the lightning protection system in a

1/16 inch lead sheathing? This lead sheathing protects these materials from corrosive action of the flue gases.

(5) Are the ground rods grounded to permanent moisture?

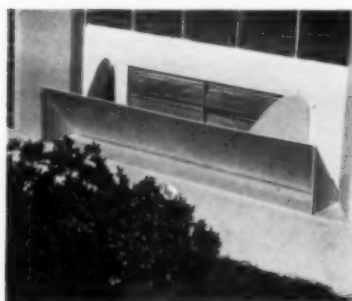
(6) Do your grounds have a low ohmic resistance? A ground resistance of less than 5 ohms is recommended. Your local utility com-

pany is equipped to make such a test for you.

A thorough survey of your lightning protection needs, particularly now, with the season close at hand, can prevent lightning damage and save you thousands of dollars. With so much at stake a nominal investment on your part by providing lightning protection is certainly worth your serious consideration.

## Deflector Saves Plant Shrubbery

**TO AVOID** discharging heated air from electric motor cooling conduits into pits or other sub-surface openings, it is customary to bring the air ducts up above floor level and place louvres or slatted openings in the window embrasures. Since the louvres or slats must be inclined so as to prevent rain from entering the building, it follows that the heated air is directed downward, drying vegetation or shrubbery planted outside the window, and causing an unsightly brown spot on grass cover.



The value of the louvres is retained by one plant which effectively deflects the heated air upward with a movable shield of light metal which, welded to fit within the window enclosure, receives the air current against an inclined surface which sends the air above the shrubbery and leaves the landscaping intact. Inclined wings at the ends of the inclined surface prevent the air current from passing around the ends of the device.

The deflector is removable readily for window cleaning or for painting.

By **ELTON STERRETT**, Houston, Texas



## Adapt Old Motors to New Jobs

**BASICALLY** sound electric motors are often left over when changes and modernization programs are completed.

By changing a few characteristics, such as speed or voltage, these motors may often be used to advantage.

Our Mustang Station has been very successful in adapting old motors for new jobs.

An example of how far one can go in revamping a motor is the following:

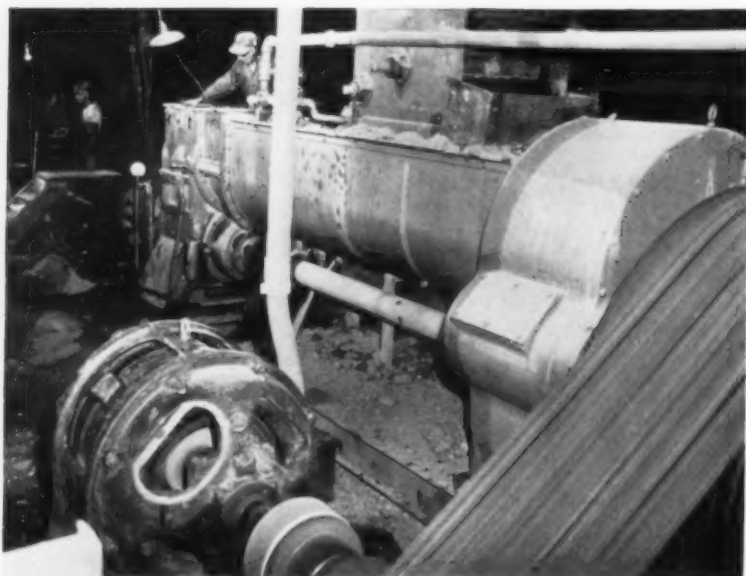
Before	After
50 Hp	125 HP
220 Volt, 3 phase	2300 Volt, 3 phase
700 RPM	1700 RPM
Babbitt thrust for weight of motor only	Ball thrust to carry motor and driven pump
Solid shaft	Hollow shaft

The re-winding was done by a commercial company. The changing of the shaft and the addition of the ball thrust and its attendant oiling system was done by plant maintenance forces in our shop.

One of the photographs shows the parts necessary for conversion. The other shows the machine work done on the upper end bell to accommodate the ball thrust and its oiling system. This, incidentally, is a piece fabricated by welding and added to a recess machined in the end bell. In the background is the motor stator prior to re-winding.

By **T. H. GEORGE**, Mechanical Engineer, Generation Department, Oklahoma Gas & Electric Co., Oklahoma City, Oklahoma

## High Capacity V-Belts . . . . .



**THIS MOTOR** was rewound, and then developed more horsepower than was thought possible. This created a V-belt problem for operators of a Maryland brick factory. V-belts selected by using the rating on the motor plate now could not pull the load. They slipped, squealed, lasted only 10 days.

The job was too big for 15 ordinary belts and it would cost \$300 for new belts and sheaves. Even more costly would be the several days' loss in production.

A B. F. Goodrich distributor studied the drive and said that the present sheaves could be used with the new BFG 40% stronger, high-capacity Grommet V-belts. They were tried. Instead of lasting only 10 days, the 15 high-capacity belts have been in use more than two years now and are still going strong.

## How to Locate Underground Runs of Piping, Cable, Etc. . . . .

By **ROBERT U. GARRETT**, Chief Electrician, Oerlikon Tool & Arms Corporation, Asheville, N. C.

**JUST WHERE** does that line go?

Hank says he remembers it about here and Bert says it's at least 6 ft deep and he seems to remember that it tees off close to that corner, then angles across the road and there should be a cut-off valve somewhere. Bet you a coke that black top's got it covered.

"If Hank's right, how come that leak's showing up 15 ft away this side? Maybe Bert's right and it's draining into that culvert."

To the maintenance man, that plaintive wail is as familiar as the auctioneer's chant to the tobacco buyer.

In S.P.I. for Nov. 1955, page 43, mention was made of a home-grown device for locating underground conductors, and a few months ago the device described again proved itself a life saver on a frozen and burst water pipe.

### The "Rube-G"

A schematic and brief description of "Rube-G" is offered as a

possible help to those who either cannot, or hesitate to, invest in one of the more expensive commercial devices (good as they are) probably involving radar frequency or sonar bounce-back circuits.

"Rube-G" is relatively inexpensive (under \$50.00). 3-pound carrying weight, and extremely sensitive reaction (up to 25 ft) recommend it very highly for the average plant. Its three essential parts, impulser, pick-up (or exploring) coil and amplification unit, are easily made and assembled by the average electrician or radio technician. The use of transistors in place of tubes helps very materially in do-ability and ruggedness.

The principle of an imposition of a signal on a conductor is common practice, but the value of a high current and a low voltage, in as far as is practical, isn't always realized. In this particular hook-up, the higher the current the better the signal and only enough voltage is employed to carry the circuit distance.

It was for this reason that a relay was chosen in place of the conventional buzzer; also, the

operating coil can be activated independently.

A return line to complete the

**No particular effort was exerted to make the "Rube-G" pretty.**





circuit is essential. Driven grounds some distance away from each end of the buried pipe are sometimes adequate, the initial signal taking the metallic path of least resistance. When the driven ground resistance is too high, a metallic return may be required above ground, in which case it must be kept as far away as practical from where the buried pipe is supposed to be.

As shown by the picture, no real attempt was made to make "Rube-G" a finished thing of beauty. The specifications are roughly:

Impulser—4½" x 2½" x 6" (less batteries)

Amplifier—4" x 3½" x 6"

Pick-up coil—2½" x 3½" x 1½"

Walking stick—flat aluminum— $\frac{1}{8}$ " x  $\frac{3}{4}$ " x 26"

Another of "Rube-G's" possi-

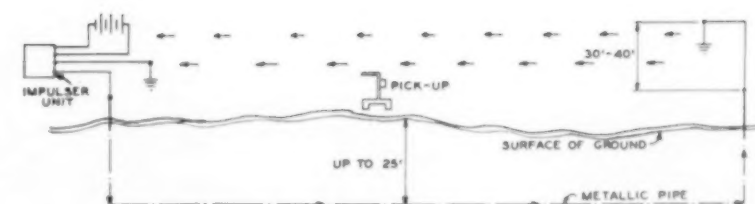


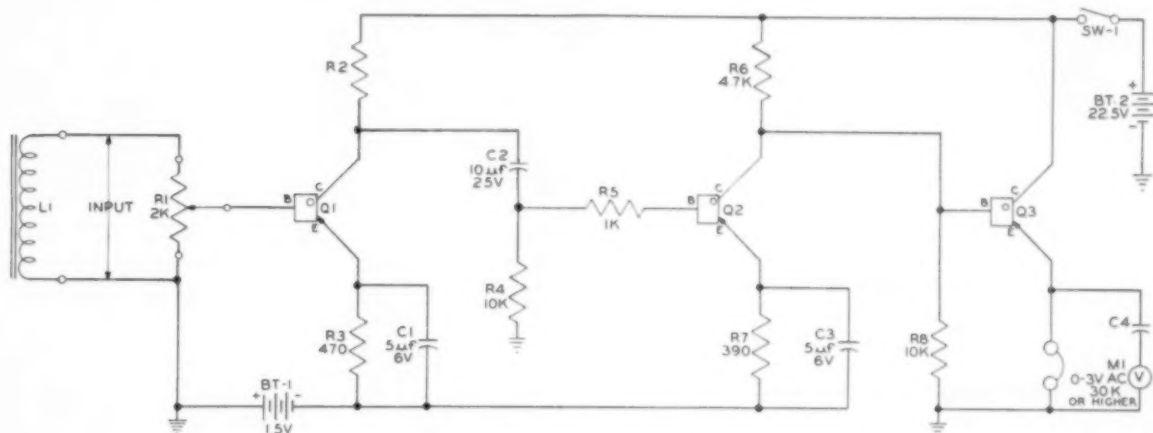
Diagram showing how system works

bilities on which experimental work is being carried on (with so far better than expected results) is the substitution, for the exploring coil, of a sensitive crystal "mike" mounted in the rubber bell of our old "plumber's friend." Mechanical vibrations on the metallic pipe by means of a clapper or vibrator have been picked up quite a distance away and the gurgle of leaking water from a ruptured coupling was detected.

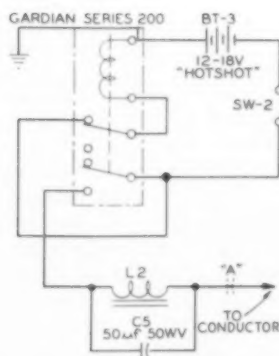
It was not so long ago that we borrowed the medical stethoscope for mechanical ills; now this amplification circuit promises to be very helpful for long distance diagnoses.

### Additional Amplification

An additional stage of amplification could probably be added to "Rube-G" but so far component values haven't been computed. It seems sensitive enough now for all practical purposes.

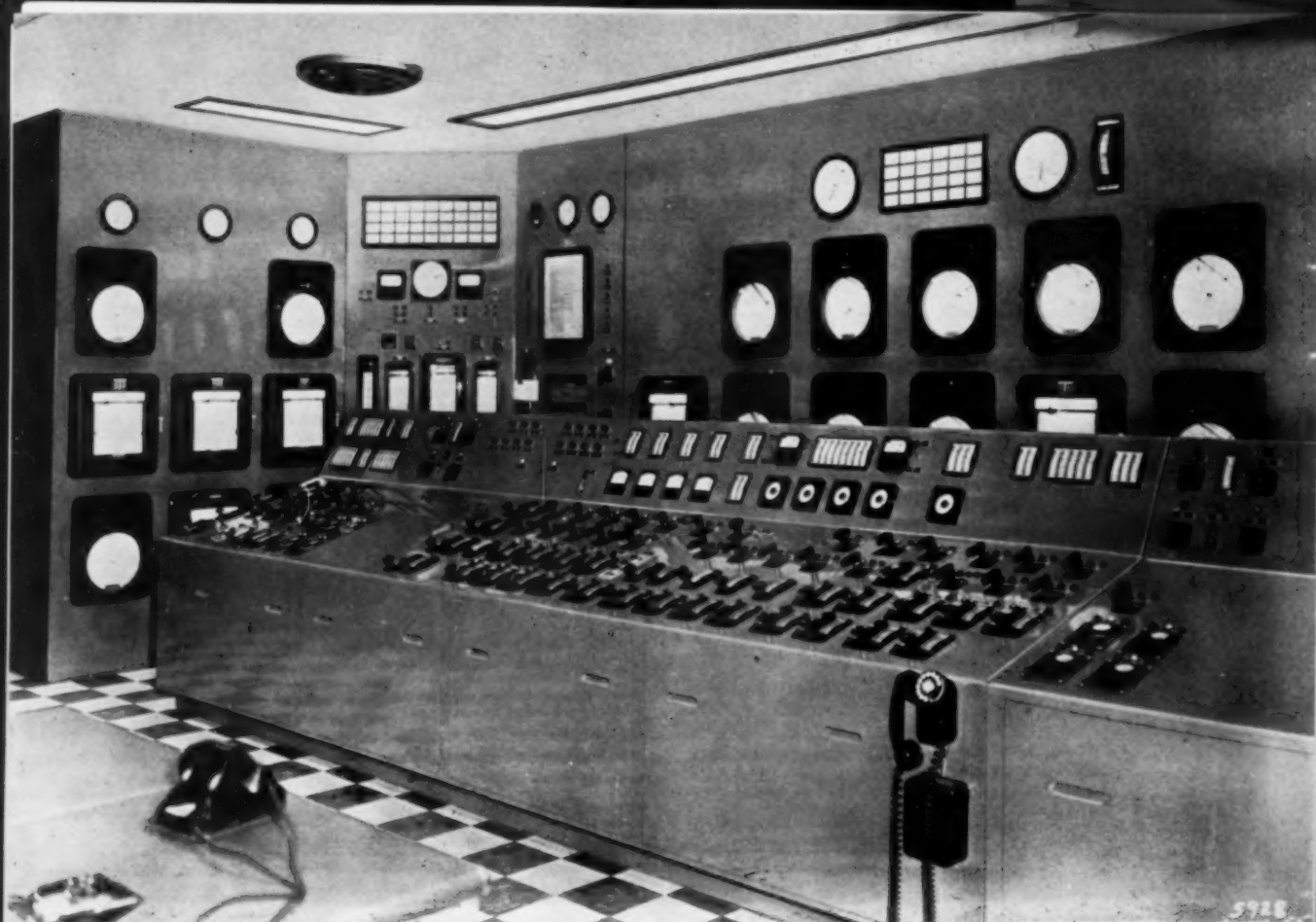


800 TO 1000 TURNS  
#30 AWG WIRE  
2.5 KVA WOUND ON  
LAMINATED CORE  
2 1/2 X 2 1/2 X 1 1/8  
SQUARE



L2 WINDING  
200 TO 300 TURNS  
#18-20 AWG WIRE  
WOUND ON IRON  
CORE 3 X 5/8  
SQUARE LAMINATED

Transistor amplification hook-up for picking up signals from underground conductors, visual & audible. Range up to 40 feet. To work conductors "hot" against ground, a small capacitor with double the voltage insulation may be cut into line at point "A".



The modern trend towards clean, air-conditioned centralized control rooms, such as this one at the Hammond Station of Georgia Power and Light, Rome, Georgia, reduces materially the time and effort needed for instrument maintenance.

## Stop Operating Gymnastics

# Help Combustion Controls Do The Work

**THE PRIME** function of combustion control is to supply fuel and air to the boiler furnace in accordance with the demand for steam. In addition, for most economical operation, air must be supplied in proper relation to fuel.

Automatic regulation of fuel and combustion air eliminates the need for constant manipulation by the operator. It is important therefore that the operator become familiar with the operation and care of the equipment to keep trouble from developing.

The boiler control system will

**By L. J. KAISER**

**Mechanical Engineer  
Bailey Meter Company**

require very little regular maintenance if the equipment has been carefully installed, and if a suitable clean source of compressed air is available. Pneumatic controls have a minimum number of wearing parts and satisfactory service for many years can be expected without replacement of parts if no unusual conditions are encountered. Regular inspection of the following

items is advisable to insure the best results:

### Compressed Air Supply

Air compressors should be provided with adequate filters on the intake to improve the life of the compressor and to prevent dust from getting into the control system. If oil lubricated compressors are used, extreme care must be taken that neither insufficient nor excessive lubrication exist, as the first will damage the compressor

(Continued on Page 104)

**CHEAP COAL--** *something to get steamed  
up about with an*

# AE VIBRA-GRATE



WHAT COAL best fits your plant pocketbook? High or low fusion? West Virginia, Illinois, or Western Kentucky? American Engineering's unique Vibra-Grate Stoker burns them all efficiently...with complete freedom from clinkers...with low excess air and low carbon loss.

Completely water-cooled, the Vibra-Grate burns low grade fuels without smoke at either low or high ratings...

and no dust collectors are necessary. Stack emission will comply with all local ordinances.

Herewith is the analysis of three coals recently burned successfully on a Vibra-Grate of 45,000 lbs. steam per hour capacity. These results are typical of others obtained with a wide variety of coals on a Vibra-Grate in a coal research laboratory in the United States.

PROPERTIES	ILLINOIS	WESTERN KY.	WEST VA.
Moisture	9.0	5.7	1.55
Ash	7.73	8.1	5.65
Volatile	35.85	38.6	31.44
Fixed Carbon	47.42	47.6	61.36
Sulphur	1.18	3.3	0.657
B. T. U.	12,121	12,500	13,560
Ash Softening Temp.	2120°	2050°	2700°

## IN SERVICE NEARLY A DECADE

Vibra-Grate Stokers of present design have been in service abroad since 1947, and earlier versions, since 1939. If you plan to install a new boiler or restoker an old one with capacities from 20,000 to 150,000 lbs. steam per hour, write for full facts about Vibra-Grate's amazing combination of advantages.

## STOKER INCINERATOR GRATES, TOO

A properly engineered stoker incinerator is today's best answer for refuse disposal...and AE's know-how in stoker design is your best assurance of all-around incinerator efficiency. Your inquiries are invited.

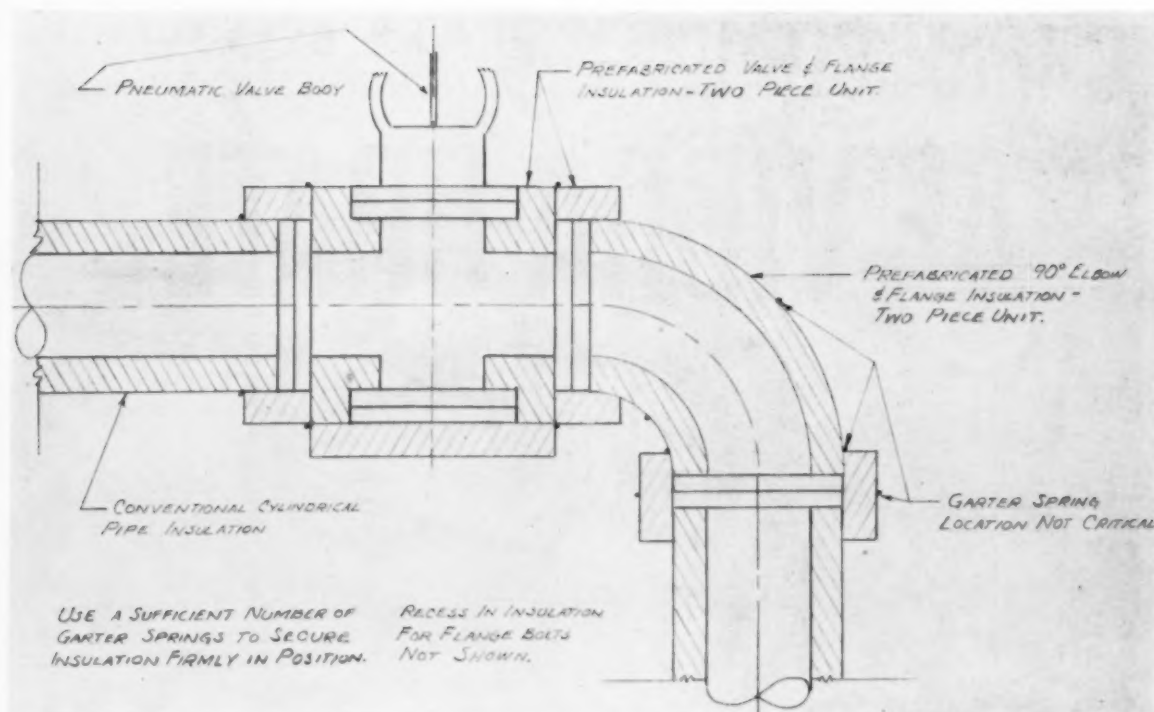
## AMERICAN ENGINEERING COMPANY

DEPT. S-103, WHEATSHEAF LANE & SEPVIVA STREET, PHILADELPHIA 37, PA.

Canadian Subsidiaries: Affiliated Engineering Corporations, Ltd., Montreal, P. Q....Bawden Industries Ltd., Toronto, Ont.

AE products are: Taylor, Perfect Spread and Vibra-Grate Stokers, Hele-Shaw and Hydramite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers, Marine Deck Auxiliaries.





Prefabricated, removable and reusable insulation for process piping

**Man-Hours and Material can be saved**

## Use Prefabricated, Renewable Insulation

By E. R. FRYER

The author is a Mechanical Engineer employed at the Savannah River Plant by E. I. duPont de Nemours and Company. The article presents the author's own opinions, and not those of his Employers.

**MAINTENANCE** should be considered when thermal insulation is being selected. Where applicable, a material which is readily installed, removable and reusable will be more effective and less expensive to maintain than permanent insulation.

One typical case shows how prefabricated insulation resulted in an annual savings of 30 to 50% in labor and material costs because it is removable and reusable. It involved applying insulation to a 10-in. flanged pneumatic valve and a 90° elbow following a semi-annual inspection.

Past practice had required from

10 to 14 man-hours to apply a two layer, permanent type insulating material. Removable insulation, as shown in the drawing was recommended, and reduced the application time to less than one man-hour. The advantages of removable insulation, in this case, are obvious.

Prefabricated, removable and reusable insulation were used for the following reasons:

1. The frequency with which this equipment had been insulated necessitated repetitive high labor and material costs when permanent insulation was applied.
2. The surfaces requiring insula-

tion are fairly complex, and as a result, the insulation had been hand cut and fitted in the field.

3. The high ambient temperatures caused disagreeable working conditions not conducive to voluntarily reducing the cost of the insulation of the equipment.

The prefabricated sections are held in place around the pipe and valve with garter springs. This means is simple, requires no tools and can be accomplished in a minimum of time.

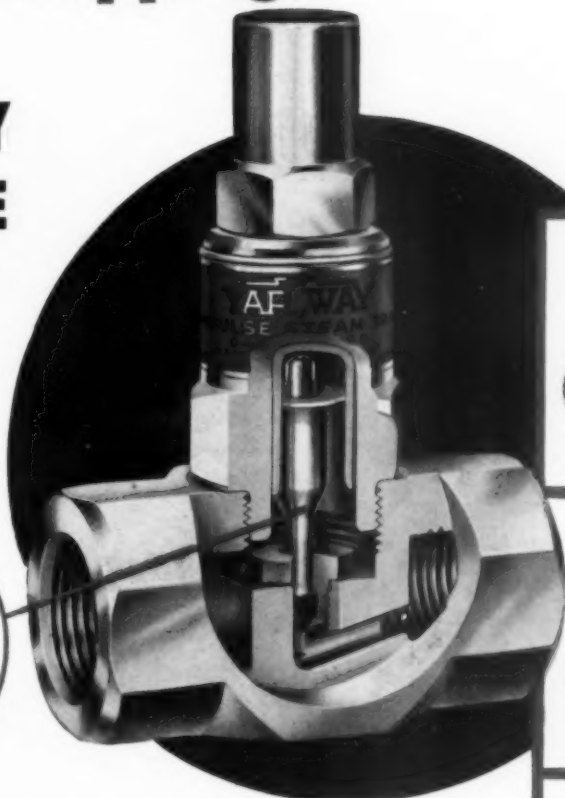
The use of removable types of insulation should begin with the preparation of insulation drawings for various standard pipe and fittings and types and thicknesses of insulation. From these drawings, prefabricated insulation can be made on a shop basis, where equipment for fabrication is available.

(Continued on Page 106)



# the impulse that revolutionized steam trapping

## YARWAY IMPULSE STEAM TRAP



### the only moving part

...a small stainless steel valve that literally floats on the condensate load. Gets equipment hot in a hurry—and keeps it hot!

Twenty years ago YARWAY applied a unique theory of thermodynamics to steam traps—and gave industry the amazing YARWAY Impulse Steam Trap.

Today — over a million YARWAY Impulse Steam Traps later — advantages like the following continue to convert new users, and convince old users to standardize on the YARWAY Impulse:

- QUICK HEAT-UP AND EVEN TEMPERATURES OF EQUIPMENT
- GOOD FOR ALL PRESSURES WITHOUT CHANGE OF VALVE OR SEAT
- SMALL SIZE—LIGHT WEIGHT
- ONLY ONE MOVING PART
- STAINLESS STEEL—minimum maintenance
- WON'T FREEZE UP
- A COMPLETE LINE of sizes and types for every requirement
- IMMEDIATELY AVAILABLE from 270 local Industrial Distributors

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Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.  
Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

# YARWAY

## IMPULSE® STEAM TRAP

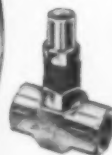
OVER 1,000,000 YARWAY IMPULSE STEAM TRAPS USED

### SERIES 60 and 120



For all normal trap requirements, pressures to 400 and 600 psi.

### 1/2" No. 20-A



For light loads on tracer lines, steam mains, small presses, etc.

### SERIES 40

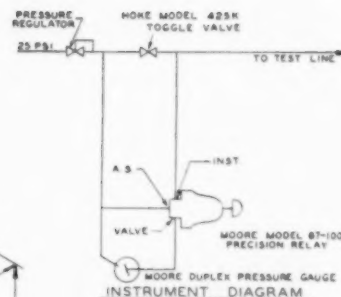
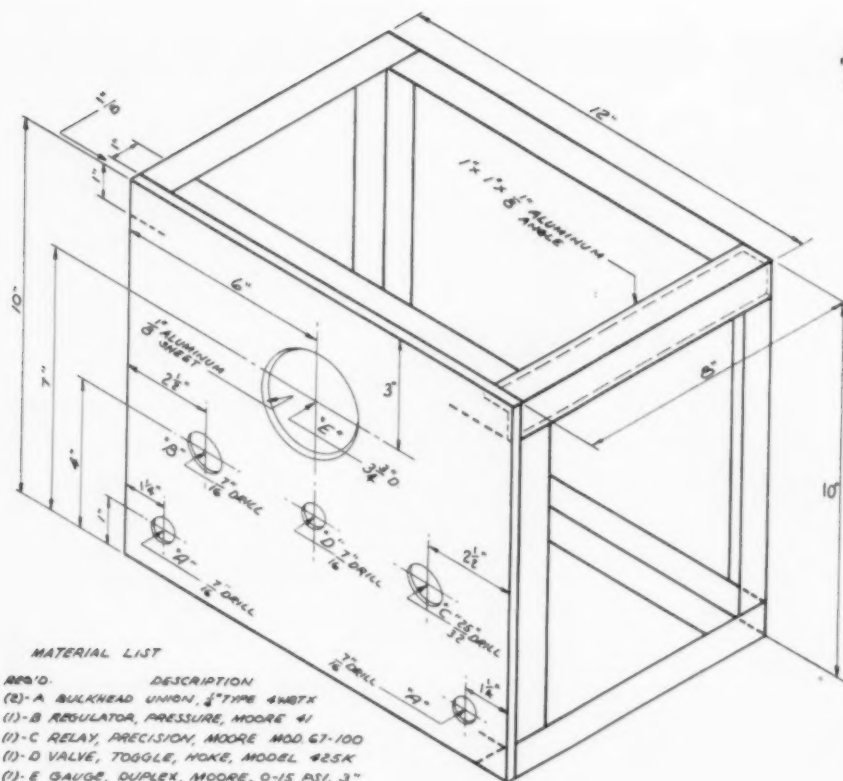


For heavy loads requiring extra high capacity steam traps.

### INTEGRAL-STRAINER HIGH PRESSURE TRAP



For high pressures, high temperatures. (Flanged or welding connections.)



## Test System Finds Leaks in Instrument Lines

**A SEVERE NEED** was filled by the construction of a simple relay system for the detection of a leak in an instrument air line or system.

With the increasing need for a high degree of accuracy in automation and instrument work, the presence of even a small air leak in a control or measurement loop can have very detrimental results. It is therefore, very important to locate such leaks quickly and get a good idea of how severe the leak may be.

The above sketch shows such a system which is very easily built from shop equipment. The pieces are mounted on a lightweight aluminum frame for easy storage and field use. Any similar shape or form of a mounting is quite satisfactory.

The system operates by connecting an air supply as indicated and attaching the other air port to the line to be tested. The other end of the line to be tested must be

plugged or connected to dead end equipment.

With the toggle valve open, adjustment of the knob on the precision relay will bring the two pointers on the dual gage together somewhere at their mid-scale. The toggle valve is then snapped closed and the deviation of the central pointer on the dual gage is noted. Since the relay is a multiplying relay, a magnified effect of a change

in pressure is noted by the movement of the pointer.

With no leak at all, the two pointers will stay together. With a given leak, the pointers will move apart at a rate depending upon the total volume of the system under test. A little experience will show the user the rate of pointer movement that can be allowed with a given system volume.

By C. S. SPINK—Maryland

### • • • • • HELP FOR EQUIPMENT BUYERS • • • • •

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**FOR SPECIAL REQUESTS — USE CARD ON PAGE 17**

# Planning a new installation?



## Here's news that may *save you money*

When you're planning a paper mill installation, one of the most critical decisions you'll have to make is the selection of pipe or tubing. Your decision, if not just right, can be an expensive one.

To give you a hand with this important chore, National Tube has established a tubing selection service. At your request, our specialists will evaluate your job specifications from every angle, taking into consid-

eration pressures, temperatures, corrosives, etc., and will recommend the particular analysis that the installation conditions warrant . . . the material that will do the best job at the lowest cost to you. And this helping hand won't cost you a cent.

National Tube manufactures

seamless pipe and tubes in a complete range of steel analyses from low carbon, through the alloys, up to and including stainless steels. A wide range of sizes and wall thicknesses are available for every mechanical and pressure purpose. Get in touch with us at your convenience.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.  
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



## NATIONAL Seamless Pipe and Tubes



UNITED STATES STEEL

*From the small*

**POWER  
PLANTS**



*to the*

***BIG ONES***



*if it's*

**COAL HANDLING ANYWHERE**

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## PVC Piping Serves Plating Plant

**CORROSIVE** action in chromium plating operations is severe. After extensive study the Perfect Circle Corporation has installed unplasticized polyvinyl chloride (PVC) piping systems to serve their new \$50,000 chromic acid recovery and solution purification facilities.

The engineering staff of Perfect Circle decided to specify PVC after laboratory and field tests indicated that it would contribute substantially to the company's rigid quality control program.

### Applications

There are five applications of PVC piping in Perfect Circle's chromic acid recovery and purification steps:

1. PVC lines, 1¼" and 1½", are employed on the deionizer. Deionized water, instead of distilled

water is used, since it most economically meets Perfect Circle's needs. The elimination of ions (electrified particles of matter of subatomic dimensions) from the process water prevents plating imperfections.

2. A 1500 gallon dilution tank where chromic acid is handled in concentrations of 10-40% is served by 2" lines.

3. Lines ranging from 1" through 2" serve a 1500 gallon adapter tank where water containing a 1% concentration of chromic acid is processed.

3. Lines (2" dia) connect to a 350 gallon sulphuric acid regenerant sump tank.

5. Drainage of regeneration wastes is through a 2½" line.

The PVC operating pressures at Perfect Circle are 25-75 psi. Tem-

peratures go from 50 to 90 F.

Dallas Lunsford, the company's chief metallurgist, was the project engineer. The installations were made by C. L. Gough, plating engineer and his staff.

### Advantages

Mr. Gough listed these advantages provided by Perfect Circle's PVC piping.

1. Scale, commonly found in metal and alloy lines, is not present and thus the acid and make-up water are protected against discoloration and contamination.

2. Hazards to personnel and equipment, caused by leakage due to corrosion, have been avoided.

3. The piping shows no signs of deterioration and is expected to be long lived. Had metal been employed, portions of the piping systems would have had to be replaced at relatively short intervals.

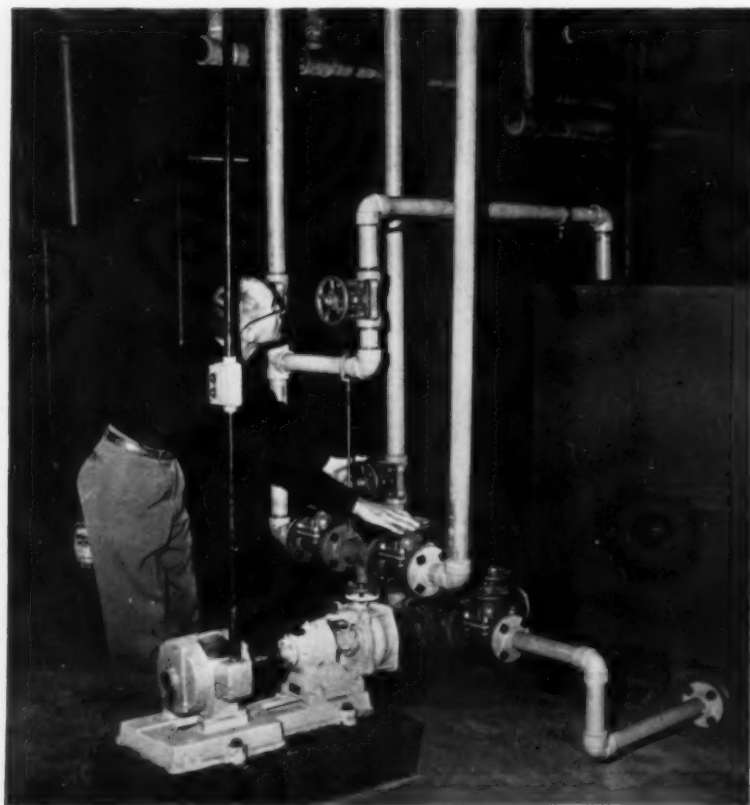
4. PVC piping requires no paint, and its external surface is as resistant to corrosion as its internal surface. This is particularly important, since a portion of Perfect Circle's piping is outdoors.

5. PVC is easy to install, and can be quickly disassembled.

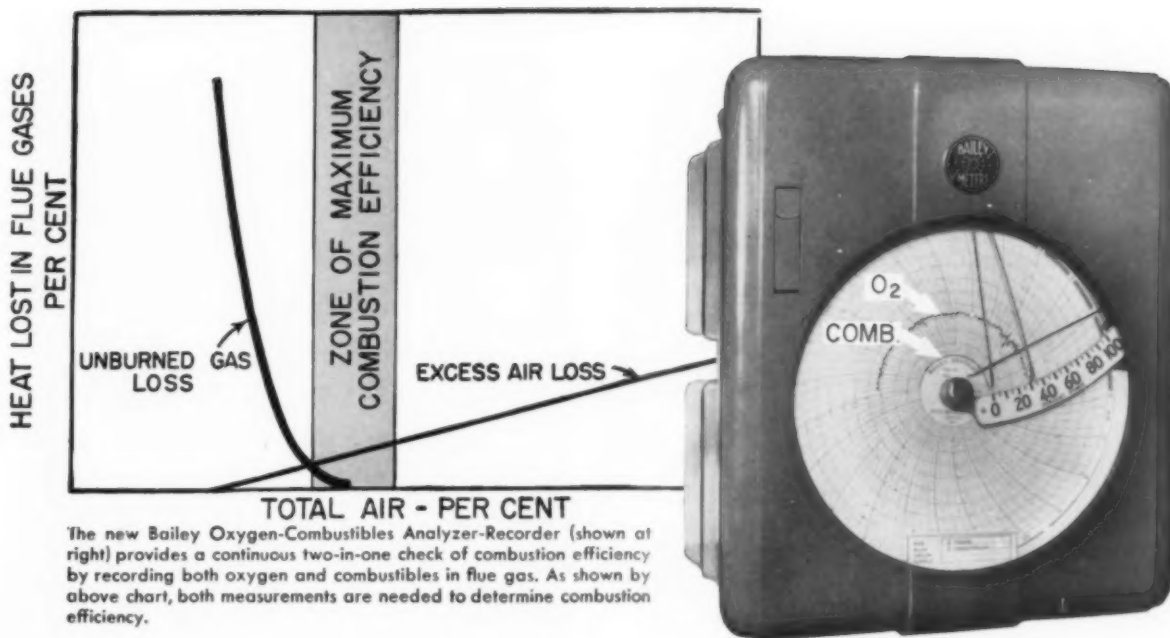
6. PVC has excellent electrical and insulating properties, and is non-aging.

7. The cost of PVC piping is much less than piping of the metals and alloys often used in chrome plating services.

Perfect Circle's PVC piping was installed with injection molded fittings made by Tube Turns Plastics, Inc., Louisville, Ky.



These 2" lines of polyvinyl chloride serve the chromic acid dilution tank at Perfect Circle. They are fabricated with injection molded fittings made by Tube Turns Plastics, Inc., Louisville, Ky.



## BAILEY announces ... New 2 in 1 way to measure Combustion Efficiency

The new Bailey Oxygen-Combustibles Analyzer-Recorder gives you a continuing double check on combustion economy. It's fast response measures and records:

1. **Excess air**—regardless of the fuel or combinations of fuels being burned.
2. **The mixing efficiency of your fuel-burning equipment**—by indicating the amount of combustibles in your flue gas, resulting from incomplete mixing of fuel and air.

Combustion efficiency depends upon fuel-air ratio. Too much fuel can be even more costly than too much air. And because of the interdependence of these two factors, no control that measures only one of them can give you complete protection.

Now, for the first time, you can check *both* with a *single* fast acting instrument, using the new Bailey Oxygen-Combustibles Analyzer-Recorder for industrial furnaces, kilns, heaters and boilers.

Fuel economy improves as excess air is reduced—until unburned fuel begins to show up in the flue gas. When this happens, combustion efficiency drops off

sharply if there are further decreases in the air-fuel ratio. That's why combustion gases must be analyzed for *both* oxygen and combustibles to get a true indication of efficiency—and that is why Bailey coordinates both measurements on the same chart, to show when excess air may be reduced safely without danger of greater losses from unburned gases.

The Bailey Oxygen-Combustibles Analyzer is an approved combustion safeguard.

Ask your local Bailey engineer for suggestions on application. Equipment details in Product Specifications E65-1 and E12-5. P31-1

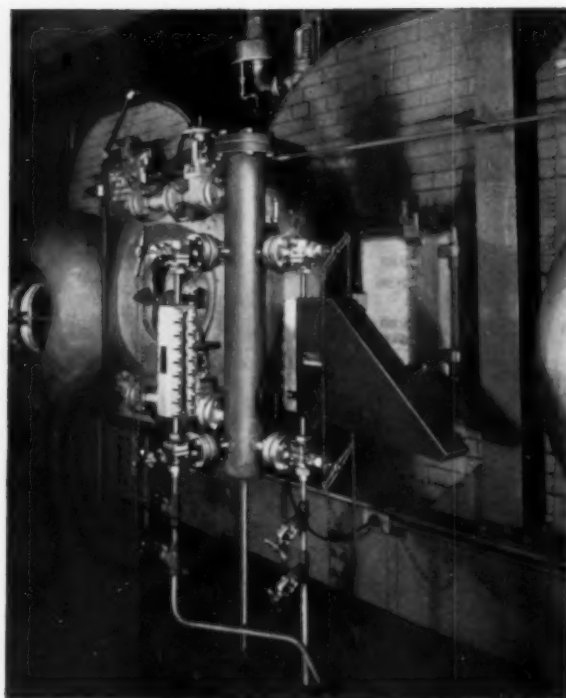
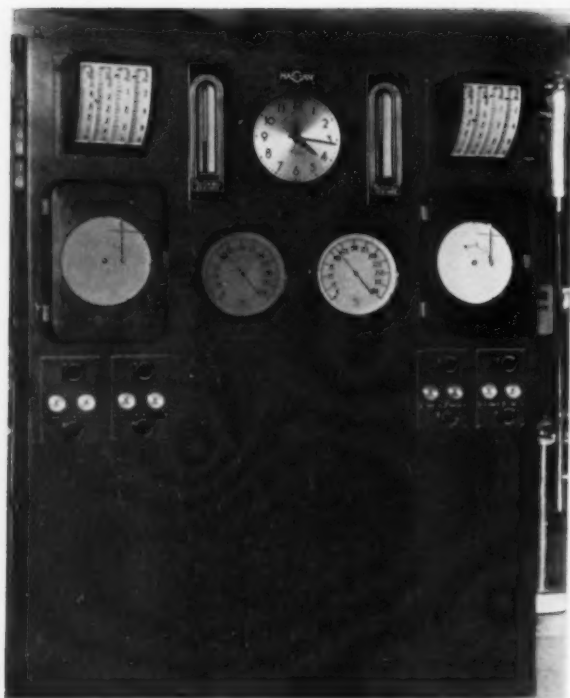


# BAILEY METER COMPANY

1028 IVANHOE ROAD • CLEVELAND 10, OHIO

INSTRUMENTS  
AND CONTROLS

*For Power And Process*



## Best Service from Columns and Gages

**MAINTAIN** water level indicating equipment as thoroughly as other vital operating devices. It will pay you to review these points.

**WATER COLUMN.** Open blow-down valve at start of each shift to flush sediment from column and to test low water alarm signal. Open and close valve slowly to avoid water shock. When operating conditions permit, raise boiler water level sufficiently to test high alarm signal.

**GAGE VALVES.** Blow down when dirty. Speed at which water returns to proper level indicates whether valve ports obstructed. Keep packing tight around valve stem and glass — leakage wastes steam and causes dirty deposits. Always use complete set of three new packing rings when needed at the nipple packing gland. One new ring with two old rings will not last.

**GAGE GLASS.** Whether you are using tubular glass or an expensive insert, the glass must be

By **FRED WALKEMEYER**

Service Engineer  
The Reliance Gauge Column Co.

clean, for accurate reading. You know from experience how long a tubular glass can be used on your boilers before it is thinned to the danger point. Change glasses regularly. Also, be sure tubular glasses have protectors to prevent injuries from bursting glass. Special cleaning fluid offered by gage manufacturers have been found to be very effective.

**GLASS INSERTS.** Prismatic and flat glass water gage inserts, if used, should be inspected frequently for leakage. Expansion and contraction may loosen bolting pressure. A slight "take-up" on insert clamping bolts may prevent blowing out of gaskets and reduce glass erosion.

**MICA.** Whether used as a protective coating to prevent glass erosion or as an insert window, treat mica with utmost care. When

possible, mica should be cleaned with alcohol or other solvent and replaced in service.

**ILLUMINATION.** Keep reasonably clean at all times. Use proper size lamp. Most illuminators are constructed to focus maximum light rays from a definite location of lamp filament. Where mirrors are employed, check cleanliness and adjustment regularly.

**GAGE COCKS.** Test daily to insure readiness for operation. Frequent testing causes less wear than occasional use because sediment is not allowed to accumulate in quantity. Never leave a gage cock "sizzling"—open it for blowdown two or three times if necessary to remove the scale.

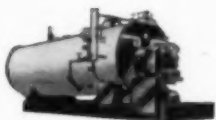
**INDICATORS.** Familiarize yourself thoroughly with the manufacturer's instructions for proper care of remote reading indicators and follow them in detail. Don't let an indicator that may be inaccurate remain in service. Hang a warning sign on it until it can be serviced.



MINIMUM INSTALLATION COST  
MINIMUM MAINTENANCE COST  
MINIMUM OPERATING COST

and

# MAXIMUM EFFICIENCY



**TESTED  
AND READY**

Not just completely factory assembled, but completely fire tested at the factory before shipment . . . and guaranteed on the basis of this test.



**BUILT  
TO LAST**

Bigger, heavier, and designed to last . . . indicative of this is the slow speed induced draft fan integrated in the design of the boiler.



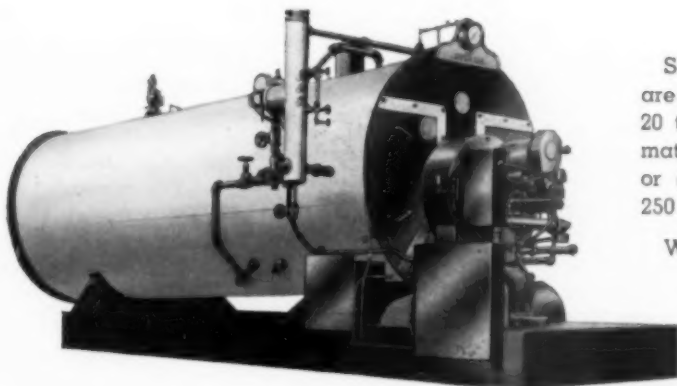
**FULLY AUTOMATIC  
BURNING OIL OR GAS  
OR BOTH**

The economy of firing that follows the load is increased by the ability to change over from one fuel to another to compensate for fluctuations in the market.



**80% THERMAL  
EFFICIENCY  
GUARANTEED**

Based on its own individual factory test, every Superior Steam Generator is guaranteed to achieve its maximum rated capacity at thermal efficiencies in excess of 80%.



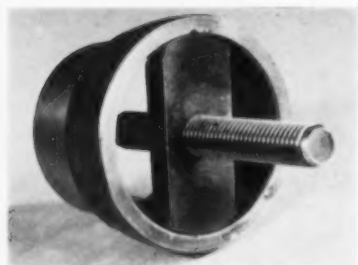
Superior Steam Generators are available in 18 sizes from 20 to 600 b.h.p. for fully automatic operation burning oil, or gas, or both. Pressures to 250 p.s.i.

Write today for Catalog 811.

for performance you can **BANK** on

**SUPERIOR COMBUSTION INDUSTRIES INC.**  
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

**SUPERIOR**  
STEAM GENERATORS



## Boiler Inspection Device

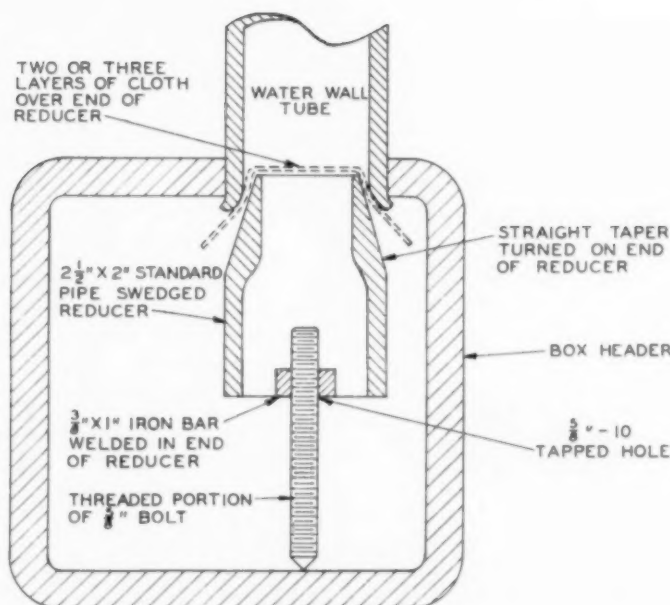
**THE STANDARD** practice followed when making an internal inspection of high pressure steam boilers in our plants consists not only of a visual inspection of the boiler internals, but also an inspection of the furnace tubes. This inspection consists of two steps.

(1) The Turner Scale Thickness Indicator is introduced into representative tubes and the amount of scale if any is recorded at various distances from the tube header. This device gives a very accurate indication of the amount of hard scale in a tube and also the distribution of this scale in the tube.

(2) An air turbine driven cutter is introduced into the same tubes and a measured distance is tur-  
bined. The opposite end of the tube

is stopped up and the material which has been "rattled" free is caught and weighed. The weight of this material is then calculated to a grams per square foot of tube figure.

The above two steps give us valuable information on the condition of the boiler, and helps determine the cleaning methods needed to put the boiler in operating condition.



In step two we have had a problem catching the material "rattled" from the tube. The device shown in the photograph is used to hold a cloth in the end of the tube which catches the scale in the same manner that a vacuum cleaner bag operates. The sketch indicates the position of this device in a tube which is being checked for scale.

By MORRIS W. RAMTZ, Southwestern Public Service Company, Amarillo, Texas

## Basic Checks on AC & DC Controls

**CONTROL** equipment is fully as important to overall operation as is the equipment it protects. Therefore, no maintenance and inspection schedule is adequate unless controls are given proper attention.

### Common sources of trouble are:

**Connections** — Loose connections develop excessive heating and may cause burn-out. Loose connections to resistor or resistance banks in wound rotor motors lead to phase unbalance or single phase operation. Loose connections at thermal relay terminals can result in over-

heating, change in calibration and possible pre-operation.

**Dirt or Rust** — Practically all breaker mechanisms are composed of a series of fulcrums, latches, latch arms and spring assemblies. Any additional friction, in the form of dirt, grime or rust which accumulates on these parts, delays or could possibly prevent operation of the assembly in time of trouble which would result in extensive damage to controlled equipment and cables through overlong sustaining of a fault.

**Pitted Contacts** — Pitted contacts become dangerous when they have less than 2/3 of their original thickness or when they have become excessively burned.

**Moisture or Fumes** — Moisture in control cabinets or on panels can cause false starts or cut-outs when holding coils, undervoltage release coils or contractor coils become grounded through moisture or through corrosion from acids. All operating coils and contractors should be checked for condition regularly and removed for varnish sealing when needed.

**Contact Pressure** — Slack contact springs cause excessive heating by reducing the effective contact area and permit continued arcing to a point of destruction. Springs should be replaced when they are slack, have become damaged or have lost tension.

**Frayed Shunts** — On d-c brush rigging or on control contactors,

Now — A Revolutionary NEW Steam Trap!

# What could be simpler?

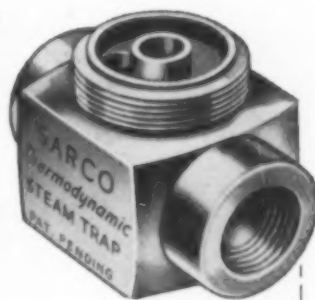
1. A CAP



2. A DISC



3. A BODY



*That's  
all!*



## Practically Eliminates Maintenance!

Look at this revolutionary new thermodynamic steam trap. Could it possibly be simpler? Look for the valve closing mechanism—there isn't any! The kinetic energy of steam closes the valve and only the TD uses this new operating principle.

Only 3 parts... cap, disc and body... machined from stainless steel bar stock... all extremely simple, rugged, durable. Only one moving part... a hardened SOLID stainless steel disc... practically wear-proof.

Just imagine how much time and expense this

new TD steam trap can save you by greatly reducing and simplifying trap maintenance and inventory!

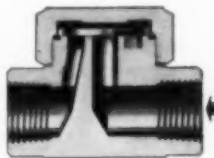
### SOME OF MANY OTHER ADVANTAGES:

1. Use the same trap for 10-600 psi... for light or heavy loads... without seat or valve change or other adjustments.
2. Closes tight on no load—no steam waste.
3. Operates against back pressure up to 50% of inlet pressure.
4. Not affected by superheat, water-hammer, corrosive condensate.
5. Only one spare part—solid stainless steel disc.

Ask for a 60 day trial installation of Sarco TD trap and strainer... write for bulletin 257. Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.

### TROUBLE-FREE DESIGN

No valve-closing mechanism to wear or stick—the kinetic energy of steam closes the valve. No critical clearances to choke. No gaskets to leak. Only one moving part—a SOLID stainless steel disc.



# SARCO

2140-B

### Only Sarco Makes All 5 Types

That's why Sarco can give impartial advice on proper steam trap selection.



Thermodynamic Steam Traps



Thermostatic Steam Traps



Float Thermostatic Steam Traps

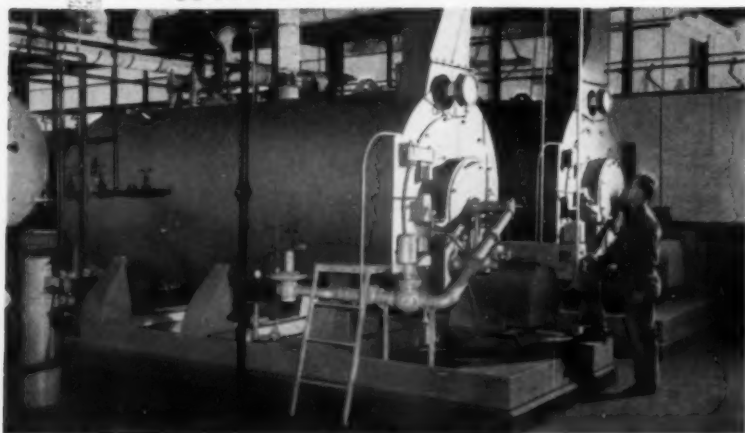


Liquid Expansion Steam Traps



Camlift Bucket Steam Traps

THERE'S  
**\$5,949.81**  
 WORTH OF READING  
 IN THIS STORY  
**CYCLOTHERM**  
 WROTE!



**T**oo high—said the Zion Cooperative Mercantile Institute, Salt Lake City, of its 1953-1954 heating costs. ZCMI is the largest wholesale distributor in the intermountain area.

So ZCMI installed two Cyclotherm Steam Generators (150 and 250 hp). And from October, 1954 to June, 1955, even in a colder winter and with additions to the ZCMI plant, Cyclotherm saved ZCMI \$5,949.81.

For full information on how ZCMI saved money with Cyclotherm—together with a month-by-month before-and-after table of ZCMI's heating costs—write to Cyclotherm today. You'll join the thousands of satisfied Cyclotherm users who report *more heat with less fuel*.

In Cyclotherm Cyclonic Combustion, air combines with fuel to form a vortex of flame, revolving at 200 miles per hour, providing maximum heat transfer. Cyclotherm is a complete package steam or hot water generator, 5 connections make it ready to work. From 18 to 500 hp, 15 to 200 psi. Meets all state requirements, A.S.M.E. and National Board Standards, is approved by Underwriters Laboratories, Inc. Write for complete booklet on Cyclotherm Cyclonic Combustion today.



**CYCLOTHERM DIVISION  
 NATIONAL-U.S.  
 RADIATOR CORP.  
 Dept. 2227 Oswego, N. Y.**

frayed shunts can cause serious trouble if permitted to go to ground. Frayed shunt straps should be replaced immediately and the shunt ends must be secure in their lug connectors.

**Relays** — Dash pot and plunger relays should be hand operated periodically to insure that the solenoid is not jammed or sealed in the dash pot damper oil. Many trip plungers have not operated for extended periods and become jammed from rust or paint flakes, or because dash pot oil has congealed to tar consistency. Renew oil in dash pots when necessary and replace bellows in older type plunger relays if the leather or rubber has deteriorated.

*Courtesy Mutual Boiler and Machinery Insurance Company*

## Wrought Iron Pipe Keeps Salt Dock Dry

**ANOTHER** first for wrought iron — pipe coils for use in "radiant drying" — was recently uncovered at the Jefferson Island, La., Salt Company's warehouse. Actually, however, the installation was a form of radiant heating!

The one difference was that heating wasn't the basic problem at the Jefferson company warehouse. Because of the chemical properties of the product being stored, dampness causes salt to set in rock-like formations. It was therefore vital that the warehouse floor and loading dock be kept dry.

The problem was all the more difficult because of the area's extremely high humidity and moisture. Prior to the installation of the wrought iron pipe coils the warehouse floor gathered as much as ½ in. of condensation in a five-hour period. Elimination of this much condensation is equivalent to evaporating 1½ to 2 in. of snow per hour. The entire warehouse area totals 2,800 sq ft, including 700 sq ft of space taken up by the loading dock.

Wrought iron pipe—1¼ in. in diameter—was coiled with 18-in. centers three inches below the floor

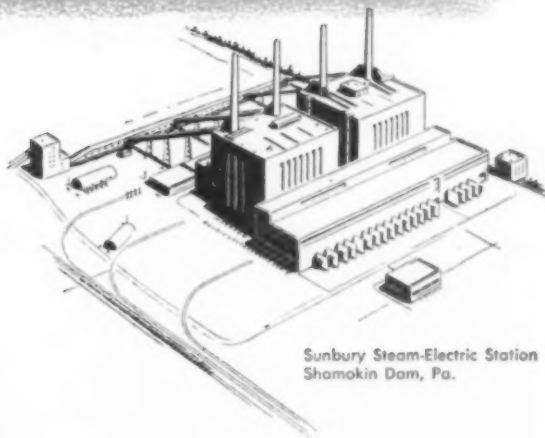


# PENNSYLVANIA POWER & LIGHT COMPANY

... an exclusive user of  
Grinnell  
prefabricated piping  
for 16 years

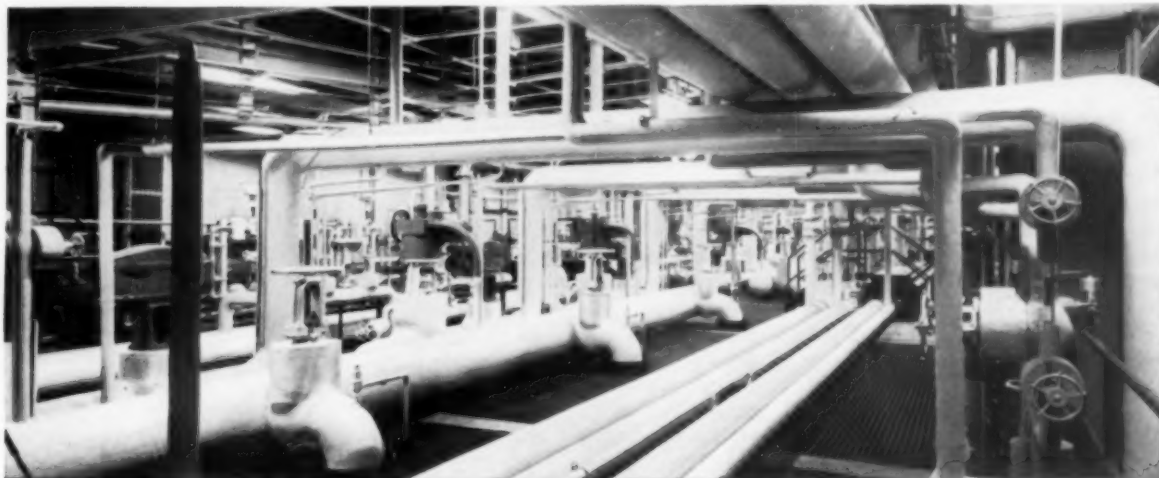
Since 1940, Pennsylvania Power & Light Company has awarded *all* its prefabricated piping work to Grinnell. Some idea of the extent of this confidence in the competence and skill of Grinnell piping specialists can be drawn from the fact that during this 16-year period there were 8 new units installed — with a total capability of close to 800,000 kw's.

Among other companies in the power field which have indicated a marked preference in the past for Grinnell Piping Products are Duke Power, a Grinnell Prefabricated



Sunbury Steam-Electric Station  
Shamokin Dam, Pa.

Where some of the 4,500 individual fabricated piping assemblies made by Grinnell were installed at the Sunbury Station.



Piping user for 44 years; New England Electric System, a 6-year, 6-time repeat customer; and Carolina Power & Light, a 7-year, 7-time Grinnell repeat customer.

The big jobs in power piping go to Grinnell because Grinnell's shop facilities offer these practical advantages... superior quality of finished product; faster "on the job" assembly; lower final cost. Assign *your* next piping job to Grinnell.

## Work done by Grinnell for Pennsylvania Power & Light Company

1940-41	Cedar Station, Unit #6
1941-42	Hauto Station, Unit #6
1949	Sunbury Station, Units 1 & 2
1950	Sunbury Station, Unit #3
1953	Sunbury Station, Unit #4
1954	Martins Creek Sta., Unit #1
(Scheduled Completion)	
1956	Martins Creek Sta., Unit #2

## GRINNELL

WHENEVER PIPING IS INVOLVED



Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves  
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies  
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

surface. A hot water boiler creates live steam, and an exchanger is then used to heat water flowing through the corrosion resistant piping, manufactured by A. M. Byers Company, to between 140 and 180 F. The Fahrenheit temperature is

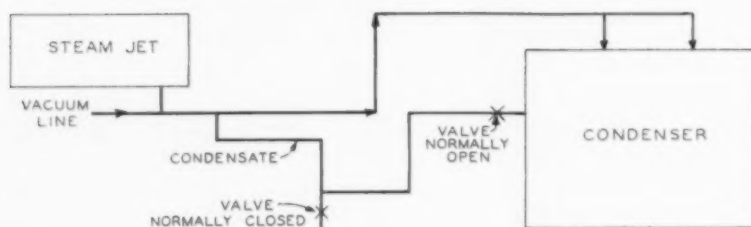
determined by the outside humidity.

Initial reports indicate the warehouse floor is warm to touch and the loading dock is completely dry 10 minutes after the end of a heavy rain.

machine in a space of 10 weeks.

The ability of the No. 95 to clean both wet and dry materials without changing or emptying the container is particularly useful for the alumina dust, which has a 20% moisture content.

## Turbine Shutdown Prevented



By R. O. WILLIAMS, Texas Electric Service Co., Fort Worth, Texas

**OUR 60,000 KW TURBINE** in a steam electric generating plant was operating satisfactorily until a water hammer developed in the main vacuum line from condenser to steam jet air extractor. Vacuum on the jet was swinging, and hammering was getting bad enough to warrant a shutdown.

A quick check of the condition proved that a drain line on the main vacuum line was stopped up. Condensate in this line is normally drawn into the condenser by

vacuum. Stoppage of the line allowed the condensate to build up and go back into the vacuum line. This caused the water hammer.

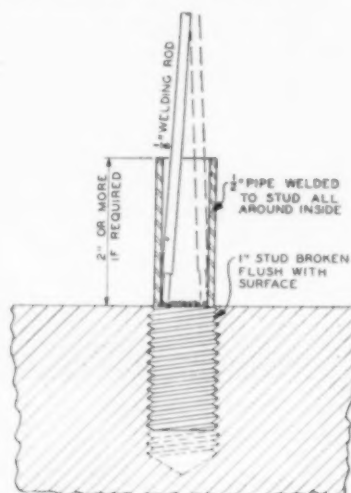
Because the condition was such that it would shut us down, it was essential to try to correct the condition promptly. We hooked an air line to the opening at the drain valve and cleared the stoppage. Thus a shutdown was prevented.

The same difficulty has occurred at another plant on our system (causing the same swinging of vacuum on the jet and hammering) and was corrected in the same manner.

## Removing Broken Studs

**THE SKETCH** illustrates a method of removing studs which have broken off at or below the surface of the material into which they have been inserted. A common repair method is to drill them out—frequently very difficult to do without excessive dismantling.

We had been having difficulty with studs breaking off in the wheels of large tractors. Since they couldn't be driven, we had to load them on large platform tractor and haul them to the shops. They were then dismantled, the studs bored out and units reassembled.



## Cleaner Saves \$24 per Week



**A VACUUM Cleaner** has accounted for a saving of \$24.00 a week for a manufacturer of fine chemicals for the pharmaceutical trade. The vacuum cleaner is used for general cleaning to prevent the spreading of very fine chemical dust.

In the photograph, a workman is shown cleaning talc-like alumina dust from an air dryer filter, using a crevice tool attachment on the hose. Cleaning time, with the Black & Decker Vacuum Cleaner, has been cut from 8 hours to 2 hours. The plant engineer estimates that this single operation paid for the

Mr. Morgan, a welder, devised the illustrated method. It was so successful that it is now regular procedure to take a welding machine out to the field where the stud removal can be handled in minimum time. It requires a good welder to properly do the job.

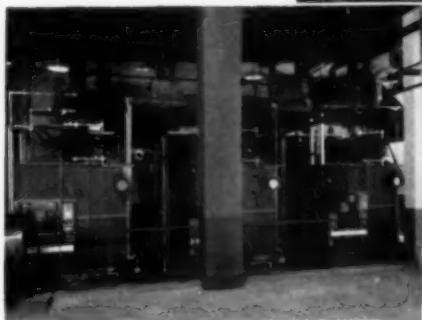
There are many places where this method can be used. It is very essential that a short piece of solid metal be inserted in the pipe to prevent mashing.

By CHAS. W. FULLER, Ch. Mech. Engr. of Sugar House, United States Sugar Corp., Clewiston, Fla.

*Trouble-free operation of QC Boilers*  
**SAVES TIME, LABOR and MONEY**  
*for Staunton Military Academy!*



Staunton Military Academy, Staunton, Va.



Battery of QC Boilers in service at Staunton.

## Central power plant now operates with increased overall efficiency!

Boiler plant modernization has more than proved its worth at Staunton Military Academy!

During 1954, three 150 H.P. oil-fired Queen City "bent tube" water tube boilers were installed to replace three stoker-fired fire tube boilers.

This battery of QC Boilers has produced with ease the 19,000 lbs. of steam per hour required for the heating load!

The switch to QC Boilers has resulted in a total

lower cost of power plant operation, has eliminated costly maintenance problems and delivers quicker and more uniform heat throughout the multi-building institution.

For all-round boiler efficiency, install a QC water tube boiler in your plant. No matter what the fuel . . . oil, gas, coal, combination gas-oil . . . Queen City Boilers give you more steam, faster and drier, for less cost! Available from 300 to 17,500 lbs./steam/hr., up to 250 psi.

*For complete information, write*



**Queen City  
Engineering Co.**

P. O. Box 3103 CHARLOTTE • NORTH CAROLINA

# Equipment . . . Supplies . . . Methods

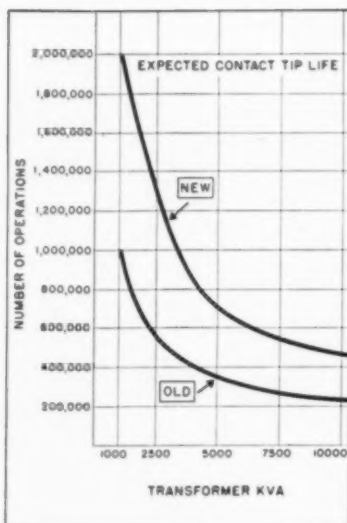
FOR FREE INFORMATION — Circle Code Number on Page 17 Return Card

## Load-Tap-Changing Medium Transformers

**E-1** Maintenance has been reduced 50% in the new RM medium transformers as well as the three-phase voltage regulators being produced by **General Electric**, Schenectady 5, N. Y.

Increased contact life in the new load-tap-changing switch cut routine inspection and maintenance costs. These savings have been made possible by: (1) reducing the amount of contact wear per operation, through redesigning the Geneva gear (providing smoother operation) and adding hydraulic dashpots (for optimum separation and engagement speeds) and (2) using heavier, thicker contact tips, from which more material can wear before replacement is necessary.

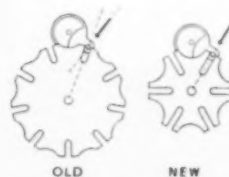
Quieter operation results from redesign of G.E.'s load tap changer. New Geneva gear is quieter, and mounting of motor and drive assembly under oil in switch compartment muffles noise.



**NEW MAINTENANCE RECOMMENDATIONS** are based on increasing the expected tip life, up to 2,000,000 operations for a 1000-KVA transformer.



**NEW HYDRAULIC DASHPOTS** provide optimum separation and engagement speeds to minimize erosion and secondary arcing—increasing tip life.



**NEW GENEVA GEAR** driving pin enters smoothly instead of 19° angle. This reduces jarring and impact, cuts noise, extends contact life.

For More Free Data **CIRCLE CODE NO.** on the Handy Return Card—Page 17

## "Synduction Motor" for General Industrial Use

**E-2** Combining the constant speed characteristics of synchronous machines with the mechanical construction of induction motors, **Allis-Chalmers Manufacturing Company**, Milwaukee 1, Wisconsin, has developed "The Synduction Motor" available in ratings from ¼ to 40 hp.

The motor requires no brushes, slip rings or windings on the rotor, separate source of direct current excitation, or special starting equipment as in the case with standard synchronous motors.

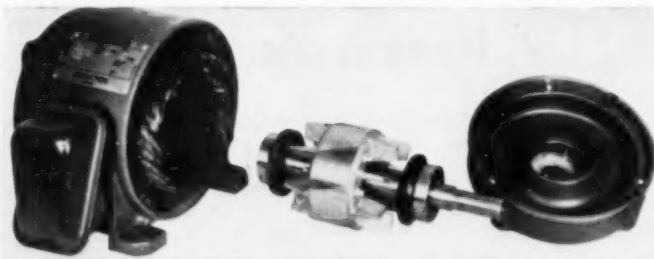
The first units were built for one of the processes in the production of synthetic fiber where a large number of motors must remain synchronized over a wide speed range. Other applications where Synduction motors are installed or are under consideration include high

speed meat slicing, drives for military electronic power supplies, packaging machinery, printing presses, sheet glass conveyors, wire drawing, continuous bristle cutting, and stable frequency converter sets.

The new machine offers several advantages over existing types of synchronous reluctance motors, and approaches the efficiency and power

factor of squirrel-cage units. It starts as an induction motor with a very high locked-rotor torque, accelerates and pulls into synchronism quickly, and runs as a synchronous motor. Having a high (175 to 200%) pull-out torque, **the motor remains in synchronism regardless of load or line voltage fluctuations.**

The new motor has been designed



Typical Allis-Chalmers Synduction motor disassembled. Motor uses a simple die cast rotor and has operating efficiency and power factor approaching that of a standard squirrel cage motor. They need only standard across-the-line starting equipment, except in the very largest ratings, where reduced voltage starters are required.



# STAYNEW

## PIPE LINE FILTERS

FOR  
**CLEAN  
DRY  
AIR**  
IN

- AIR OPERATED INSTRUMENTS
- AIR OPERATED TOOLS
- PNEUMATIC CONTROLS
- INDUSTRIAL PROCESSES

**MODEL CPH PIPE LINE FILTER** has exclusive Staynew "double action principle." Air is first deflected to outer walls of filter and forced downward at high speed. Water, oil and heavier particles of rust, etc., are thus deposited in base. Mechanically cleaned air then rises to pass through filtering medium which removes lighter airborne particles. This double action design eliminates need for frequent cleaning.

Inexpensive, simple to install and maintain, Staynew Pipe Line Filters keep your



**Model CPH  
PIPE LINE  
FILTER**

air-operated equipment free from the destructive effects of pipe scale, dust, dirt, and condensates. And, Staynew Filters pay for themselves in reduced equipment maintenance costs alone. They filter compressed air under all pressures and temperatures, natural and manufactured gases. Dollinger engineers will welcome your filtration problems. Why not call on us. Remember, Dollinger makes every type of filter for every industrial need.



**DOLLINGER**  
CORPORATION

**ALL TYPES OF FILTERS FOR  
EVERY INDUSTRIAL NEED**



**INTAKE  
FILTERS**



**LIQUID  
FILTERS**



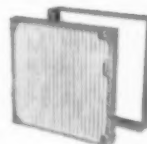
**PIPE LINE  
FILTERS**



**ELECTRO-  
STAYNEW  
PRECIPITATOR**



**AUTOMATIC  
AIR  
FILTERS**



**PANEL  
FILTERS**



**SPECIAL  
FILTERS**

Write for Bulletin 200 which contains complete engineering data and illustrated material on Staynew Pipe Line Filters. Dollinger Corporation, Dept. 40, Centre Park, Rochester 3, N. Y.

LIQUID FILTERS • PIPE LINE FILTERS • INTAKE FILTERS • HYDRAULIC FILTERS  
ELECTROSTATIC FILTERS • DRY PANEL FILTERS • SPECIAL DESIGN FILTERS  
VISCIOUS PANEL FILTERS • LOW PRESSURE FILTERS • HIGH PRESSURE FILTERS  
AUTOMATIC VENTILATION FILTERS • NATURAL GAS FILTERS • SILENCER FILTERS

## Equipment, Supplies & Methods (Continued)

to operate over a wide frequency, and therefore, a wide speed range. Frequencies of 300 cycles and speed above 10,000 rpm are available.

At present, each Synduction motor is being engineered for an individual application. Inquiries must include information on load inertia, accelerating time requirements, elec-

trical supply characteristics, speed range, enclosure required, and any other electrical or mechanical information that would affect the design of the motor.

### High Capacity Vibration and Shock Isolator

**E-4** Permitting direct mounting of the heaviest machinery without special chasis or foundations, the **Korfund Co., Inc.**, 48 32nd Place, Long Island City 1,

N. Y., is marketing the SK Vibro-Isolator rated at 75,000 lb for steady-running application and for 50,000 lb for impact application.

Installing heavy equipment, whether or not vibration control mounts were used, was formerly highly expensive. Unisolated, heavy machinery often requires large concrete foundation. If they are mounted on isolators of smaller capacity than that of the SK/50,000 Vibro-Isolator, direct mounting of presses and other machines weighing up to 300,000 lb is feasible and economical with only 4 isolators and without heavy foundations.

### Renewable Seat Ring Bronze Gate Valve

**E-3** In a renewable seat ring gate valve designed by **The Fairbanks Company**, 393

Lafayette St., New York 3, N. Y., the valve never has to be removed from the line to replace seat rings.

It is only a matter of removing the bonnet, loosen the retaining screws and lift out the seat rings from the body. The new seat rings slip into place and are positively secured again with the retaining screws.

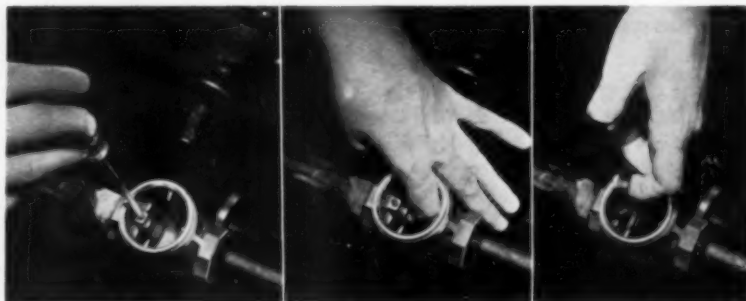
Under all conditions from steam to corrosive liquids, seat rings have been replaced in from 7 to 10 minutes.

Made with either rising stem or non-rising stem construction in  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ ", and 2 inch sizes, the Fairbanks Renewable Seat Ring Bronze Gate Valves are recommended for severe service conditions on 200 lb steam pressure at 550 F, 400 lb water, oil or gas pressure — non-shock — lines requiring full flow and subject to frequent operation.

**HERE'S HOW** seat rings are replaced without removing valve body from the line.



Bonnet removed from valve body. With bonnet off (right) seat ring is readily accessible.



Screwdriver loosens retaining screw; finger hooks inside seat ring; seat ring lifted right out of valve body.

## KEEP UP-TO-DATE

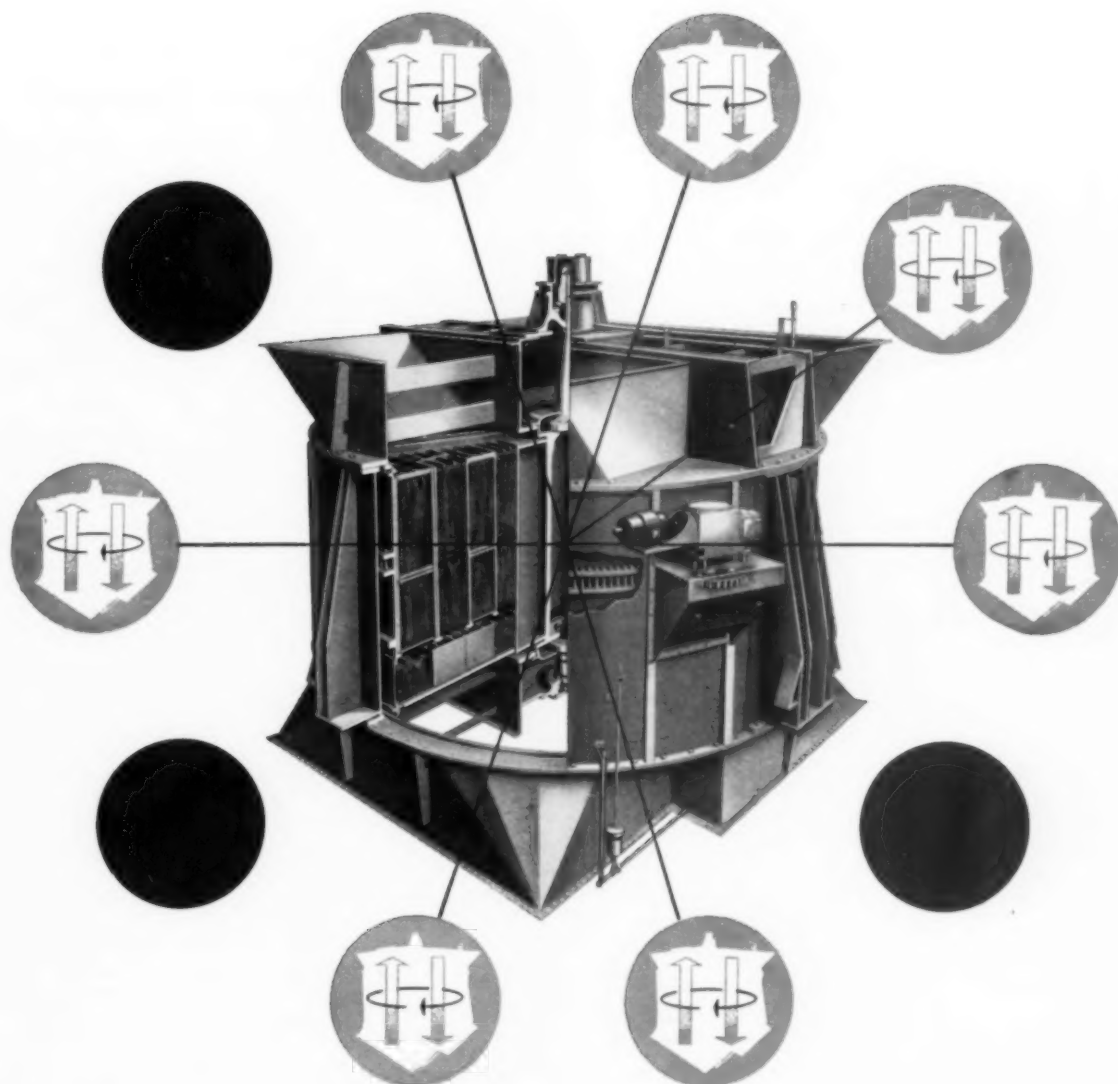
- Ideas
- Methods
- Equipment

## USE SPI READER SERVICE

See Service Cards  
Pages 17 & 18



New seat ring is inserted; retaining screw tightened; and bonnet replaced on valve body.



*7 out of 10* **air preheater installations are Ljungstrom®**

**Advantages of the Ljungstrom Air Preheater**

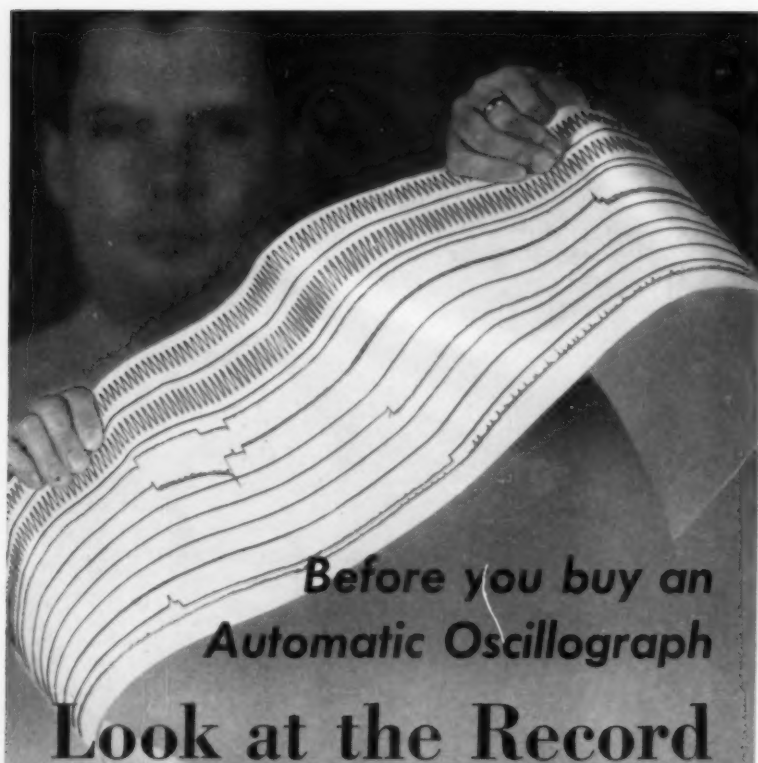
- Size for size, recovers more heat than any other type.
- Reduces fuel consumption. Permits use of lower-grade fuels. Increases boiler output and reliability.
- Eliminates cold spots . . . keeps corrosion to a minimum.
- Easier, faster to clean and maintain.
- Requires far less supporting steel and is quickly erected.

**FUEL ECONOMY** is the big reason.

Size for size, the Ljungstrom recovers more heat than any other type of air preheater. And with every 45-50 F of air preheat you cut your fuel bill 1%.

Write now for your copy of our 38-page manual, for handy reference.

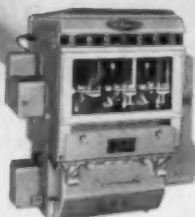
**The Air Preheater Corporation** 60 East 42nd Street, New York 17, N. Y.



## Before you buy an Automatic Oscillograph Look at the Record

Look at the record of Hathaway's engineering know-how, achieved through years of experience in the automatic oscillograph field... Then look at the records taken by the new Hathaway RS-9 Fourteen and RS-9 Thirty.

A look at these records proves Hathaway RS-9's are the best automatic oscillograph investment you can make. Hathaway RS-9's give you time-proven performance... plus... More channels... Faster starting... More types of starting relays... Sharper traces... Lower expansion cost.



RS-9 Fourteen



RS-9 Thirty

Write today for information on the new RS-9's. If you wish, a qualified Hathaway engineer will call to discuss your application.

# Hathaway

INSTRUMENT COMPANY

SUBSIDIARY OF

## Hamilton

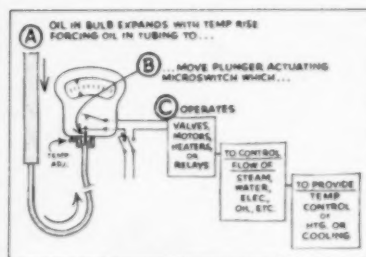
WATCH COMPANY

1315 SOUTH CLARKSON • DENVER, COLORADO

## Equipment, Supplies & Methods (Continued)

### Electric Indicating Temperature Controllers

**E-5** A versatile Type LSI electric indicating temperature controller recently introduced by **Sarco Company, Inc.**, Empire State Bldg., New York 1, N. Y., can be used to provide sequence control combinations, such as: Step-heating, heating and cooling, wide differential control, holding and operating temperatures and temperature control plus operation of signal devices.



The sketch shows principal of operation. It is adjustable, indicating and provides dependable accuracy to plus or minus  $\frac{1}{2}$  F. Turn one knob to change the temperature control setting. Large, easy-to-read scale shows both actual and the set temperature.

Interval timers and time clocks are often included in the circuit to provide even more flexible temperature control. Relays or starters are used when required by current load.

### Convert Belt Conveyors to Magnetic Conveyor-Elevators

**E-6** Permanent non - electric Magna - Rails for making magnetic conveyors are being marketed by **Eriez Manufacturing Company**, Erie 6, Pa. They convert ordinary belt conveyors to magnetic conveyor-elevators so that you can move nails, cans, metal parts, scrap, etc., up inclines as steep as 75 to 80 degrees.

The Magna-Rail is a specially designed circuit of powerful Alnico

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17



THE SUN ALWAYS SHINES ON PEROLIN CUSTOMERS



**50 YEARS OF PROGRESS** have built a world-wide PEROLIN organization. PEROLIN PRODUCTS meet the maintenance needs of power plants on land and sea and they are the choice of engineers the world over. Whatever your problem, wherever you are, just call a PEROLIN representative and let him help you.



Write today for free technical information on any of these guaranteed PEROLIN PRODUCTS:

- Algae Preventive
- Rapid Cleaner
- Condenser Treatment
- Boiler Treatments
- Soot Remover
- Tank Coating
- Brine Treatment
- Drain Cleaner
- Feed Water Treatment
- Fuel Oil Treatment
- Humidifier Treatment
- Water System Treatment
- Diesel Fuel Oil Treatment
- Steam and Return Line Treatment

*The* PEROLIN COMPANY, Inc.

Manufacturing Chemists since 1904

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51 WAREHOUSES IN THE U. S., CANADA,  
AND FOREIGN COUNTRIES

A HALF-CENTURY OF EXPERIENCE THE WORLD OVER

**TO  
KEEP  
COSTS  
DOWN**



**KEEP  
PRODUCTION  
UP  
WITH**



## **MANZEL FORCE FEED LUBRICATION**

*Pressure Application — Exact Amounts — Accurately Timed*

Manzel Force Feed Lubricators insure efficient machinery operation by lubricating automatically. No stops for hand oiling — or because of breakdowns caused by faulty lubrication. They



quickly pay for themselves through savings in down time, labor and lubricants.

These sturdy, dependable lubricators can be installed on new or existing equipment. Write for details.



*Professionally qualified engineering  
representatives throughout the country.*

DIVISION OF

**HOUDAILLE INDUSTRIES, INC.**  
318 BABCOCK ST., BUFFALO 10, N. Y.

## **Equipment, Supplies & Methods (Continued)**

V magnetic castings, 4" wide, 1 15/16" high, available in standard lengths of 3, 4, 5 and 6 feet. Other sizes may be ordered as needed.

By simply placing the needed lengths under your conveyor belt, you immediately convert it to a magnetic conveyor or elevator system, eliminating production slow-downs and losses, and reducing floor space requirements.

Magna-Rails are completely non-electric, no outside power is required and no maintenance is needed. The Alnico V permanent magnetic element is guaranteed to last indefinitely.

For More Free Data **CIRCLE CODE NO.**  
on the Handy Return Card — Page 17

## **Linings & Coatings for Corrosion & Abrasion Protec.**

A complete rubber, neoprene and polyvinyl chloride factory applied lining and coating service for pipes, valves, tanks, ducts, vessels, etc., is being offered Southern industry by the **Radiator Specialty Co., 1400 West Independence Blvd., Charlotte 8, N. C.**

Coatings provide protection against corrosion and abrasion in handling acids, bases, salts and fumes. Compounds may be made conductive or non-conductive, soft or hard, suitable for high or low temperature operations, etc.

Valves — complete lining and rehabilitation service on valves of all sizes or types.

Pipe and Fittings — All sizes or types. Individual sections or fittings can be relined for repair and replacement, or complete fabrications can be provided.

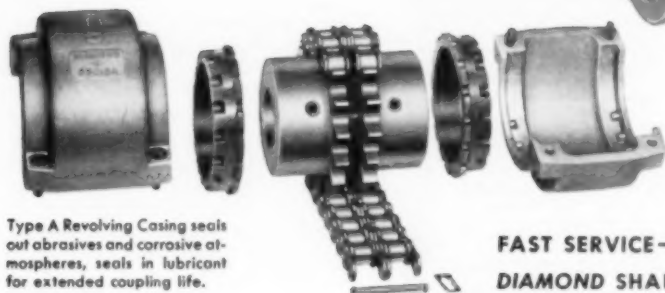
Dip-Coating — Special process dip-coatings on everything from funnels, trays and baskets to fans and metal parts requiring finish protection.

Tanks, Chutes, Ducts — Storage tanks, plating tanks, chutes, fume ducts, or complete ventilating systems.

As a local Southern source, company offers speedier service, lower transportation costs, and savings in maintenance and new installations involving such equipment.



**FLEXIBLE COUPLINGS—  
FRACTIONAL TO HUNDREDS  
OF HORSEPOWER  
*IN STOCK* AT YOUR  
DIAMOND DISTRIBUTOR**



Type A Revolving Casing seals out abrasives and corrosive atmospheres, seals in lubricant for extended coupling life.

**FAST SERVICE—HIGH CAPACITY—SUPERIOR QUALITY  
DIAMOND SHAFT COUPLINGS**

◆ End to end shaft connections can be made quickly, inexpensively and in minimum space with Diamond Flexible Couplings. Load is carried at the greatest radius and distributed evenly over the entire length of chain for maximum capacity and life. Moderate angular and parallel misalignment as well as shaft end float are absorbed in the clearances between chain and sprocket teeth.

◆ You probably have many applications where the use of Diamond Flexible Couplings can provide improved operation and long dependable service. Call your nearest Diamond Distributor for immediate service. His name is in the yellow pages of the telephone book under the heading Chains or Chains-Roller.

Bulletin No. 19 contains complete selection data for stock Diamond Couplings. Your copy sent on request.



**DIAMOND CHAIN COMPANY, Inc.**

Where High Quality is Traditional  
Dept. 612, 402 Kentucky Ave.  
Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

**DIAMOND**



**ROLLER  
CHAINS**

# TO GUARD YOUR WORKERS AGAINST SKIN AILMENTS



Antiseptic All-Purpose Skin Cleanser

Powered with ACTAMER\* for Dermatitis Control

For easy filling of dispensers VI-LAN CLEAN is provided in polyethylene bags, thru which you may squeeze all or as much as is needed into the dispensers without waste.

Also available is a portable self-service unit, No. 815, equipped with 2 dispensers, 2 Scott industrial wiper brackets, plus a large waste disposal bin of large capacity.

For your convenience, VI-LAN CLEAN also is shipped in pint and quart can containers. Write NOW for descriptive folder and sample.



VI-LAN CLEAN is a degerming cleanser guarding your employees hands and bodies against irritation and infection.

VI-LAN CLEAN is fortified with ACTAMER\*, evolved by the Monsanto Chemical Company. It is a potent bacteriostat that reduces resident skin bacteria by as much as 97%.

This emulsion paste cream does what soap and detergents can not do. Non-alkaline and acid free, and whether used "with or without water," it will not in any way effect the insulation value of rubber gloves. It controls dermatitis, and is a preventive of poison ivy and creosote burns.

VI-LAN CLEAN cleanses while it guards hands, face and body against skin contaminations; it removes greases, oils, paints, acids, epoxy resins, glues, printing inks, asphalt, thinners, crater compounds, rubber and gasket cements. It is non-irritating. It contains lanolin to restore natural skin qualities.

For safety's sake, for cleanliness, to prevent skin ailments and lost man hours, absenteeism and expensive compensation claims, give your employees the benefits of VI-LAN CLEAN. Place VI-LAN CLEAN dispensers on your trucks and other service units, and the larger self-service units in all wash rooms and in critical on-the-job locations, to economize and to speed up your employees wash-ups. There is nothing like it anywhere.

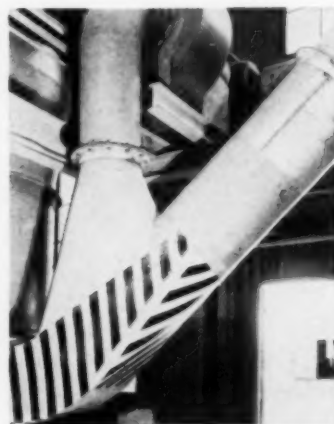
**DAMERON**  
**enterprises, inc.**

427 So. 20th Street  
Louisville 3, Kentucky

## Equipment, Supplies & Methods (Continued)

### Maintenance Plastic

E-8 Celastic and BBX, the maintenance plastic that often works where other methods fail, is being marketed by **Wilson and Mankin**, Box 489, Decatur, Georgia.



Celastic is a plastic impregnated fabric made by a du Pont subsidiary. BBX is the activator that adds to its remarkable adhesion to wood, metal, concrete or masonry.

Compound can be used to make permanent repairs to duct work, fan housings, to waterproof cracked and leaking concrete, or to cover exterior insulation. There are many uses as a general repair item in any manufacturing or utility plant.

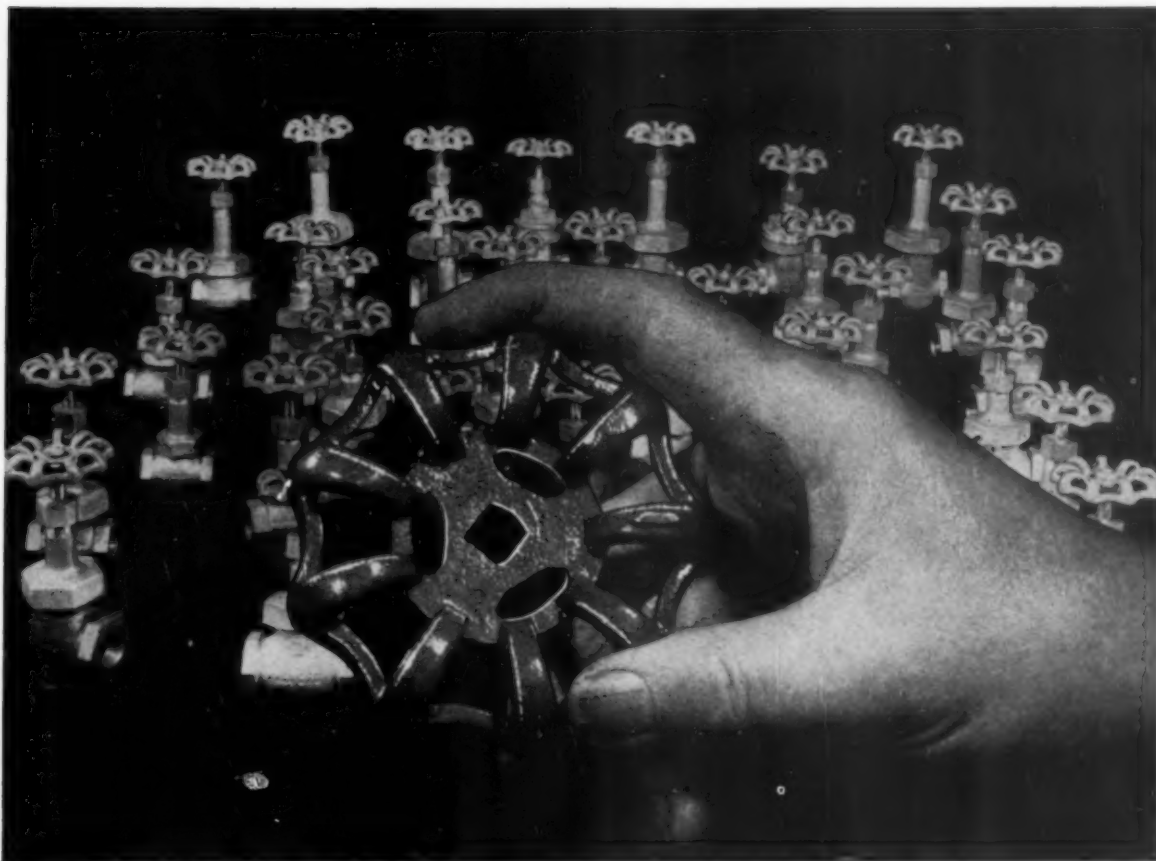
### Cement Lining Restores Corroded Water Tanks

E-9 Large water storage heaters and steel tanks that are rusting away on the inside can be restored to perfect operating condition at little cost by lining them with a new do-it-yourself cement preparation, according to **Pocono Fabricators, Inc.**, division of The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

C-17 Pre-Krete is a specially prepared and blended cement formula that will not shrink or crack and

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17





## One handwheel fits 40\* different valves

**\*Walworth Handwheel No. 16  
fits these  
Walworth Bronze Valves:**

<b>3/4"</b>	No. 32, 40, 47, 48, 205, 206, 225P, 227P, 260, 261, 260P, 261P
<b>1"</b>	No. 29, 30, 36, 37, 91, 0X91, 92, 95, 96, 160, 161, 235, 236, 245, 246, 245P, 246P, 237P, 238P
<b>1 1/4"</b>	No. 58, 59
<b>1 1/2"</b>	No. 2, 3, 4, 11, 12, 14, 24

**Only Walworth Bronze Valves give you  
this degree of interchangeability**






With standardized Walworth Bronze Valve parts you maintain the greatest number of valves with the smallest inventory of basic parts. Handwheels are just one example. Fourteen different sizes of handwheels are all you need for fifty lines of gate, globe, and angle valves, involving 420 individual valves.

The Walworth system of interchangeability of parts for Bronze Valves is unsurpassed by any manufacturer in the field. In addition to Bronze Valves, Walworth produces valves and pipe fittings of iron, steel, special alloys, and rigid polyvinyl chloride (PVC).

Learn more about Walworth interchangeability. Contact your local Walworth Distributor or nearby Walworth Sales Office. Ask for literature.

# WALWORTH

60 East 42nd Street, New York 17, New York

**SUBSIDIARIES:**  **ALOYED ALLOY STEEL PRODUCTS CO.**  **CONOFLOW CORPORATION**  **M & H VALVE & FITTINGS CO.**  
 **SOUTHWEST FABRICATING & WELDING CO., INC.**  **WALWORTH COMPANY OF CANADA, LTD.**

## SINTERED POWDERED BRONZE BEARINGS AT THEIR

# *most modern best!*

Bunting's many years of experience in the manufacture and distribution of Cast Bronze Bearings gives the highest standards of precision, quality and worth to the new Bunting stock sintered Bronze Bearings. These better sintered bronze products are now available from Bunting Distributors.

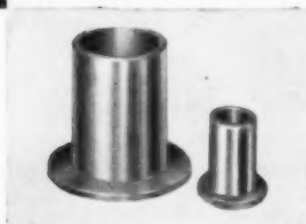


Bunting's research facilities and resources are producing quality, precision and unvarying uniformity in self-lubricating bearings made of sintered powdered bronze. Plain bearings, flange bearings, thrust bearings and bars made of this increasingly popular material now can be had in sizes and standards not heretofore available from stock.

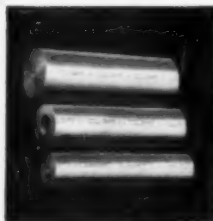
**BOTH** Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are

available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on

Bunting Cast Bronze and Bunting Sintered Bronze Bearings.



MAY  
is  
NATIONAL  
WATER SYSTEMS MONTH



# Bunting®

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS  
OF CAST BRONZE AND POWDERED METAL

The Bunting Brass and Bronze Company, Toledo 1, Ohio  
Branches in Principal Cities • Distributors Everywhere

## Equipment, Supplies & Methods (Continued)

is not subject to high temperature failures. Tinted a light green, this lining is easy to apply and, under normal temperature and atmospheric conditions, will "set" in a few hours.



**How It's Applied** — In applying Pre-Krete, the interior of the storage tank or steel heater is first dried and usually cleaned with a wire brush. However, Pre-Krete may be applied directly over rusted areas. Pre-Krete is then mixed with water (about 2 gallons to a 95 lb bag) to a consistency of paste.

Pre-Krete is applied with a trowel to a thickness of  $\frac{1}{8}$ ". After the lining has "set", a small amount of water is placed in the tank and the man-hole closed. In such a moisture-laden atmosphere, Pre-Krete will cure in 24 hr. (For open-type vessels, the lining is hosed periodically with water to aid curing.) An average size tank can be completely lined and cured over a weekend.

**How It Saves Money**—A corroded tank can be lined with Pre-Krete at 1/10 the cost of buying a new tank of the same size, according to Pocono Fabricators. For example, replacement of a large size steel tank may run to \$4,000.00 or more, considering cost of tank, cost of installation, possible alteration to existing facilities and other expenses. On the other hand, the old tank can be lined with Pre-Krete for around \$400.00, including cost of labor. This restored tank will then be in operating condition for five, ten or more years.

For More Free Data CIRCLE CODE NO.  
on the Handy Return Card — Page 17

General Manager Bechtold of Kern Ice and Cold Storage Company, Inc., points out one of two banks of SPANG Pipe serving a 40' x 60' cold storage room. Total plant storage area is 972,000 cu ft.



## Again . . . SPANG Pipe lives up to its reputation 10 YEARS COLD . . . AND STILL GOING STRONG!

"After carrying corrosive anhydrous ammonia for more than 10 years and weathering frequent exposure to SO<sub>2</sub> gas used to protect grapes from insect and fungus life, our SPANG CW Piping is ready for another 10 years of service!" says Mr. R. E. Bechtold, general manager of Kern Ice and Cold Storage Company, Inc., Bakersfield, California.

"The fact that we have been able to completely forget about our piping system is an indication of how much we can rely on it. SPANG Pipe has done a fine job for us."

Kern Ice and Cold Storage Company, Inc., which opened for business in 1945, stores potatoes, grapes and frozen foods for farmers and distributors at temperatures ranging from 40°F above to 40°F below zero. Installed at the time of construction were 5,016 ft of 2" SPANG CW Steel Pipe to carry the refrigerant.

Cold storage service is a tough assignment for pipe. Corrosive anhydrous ammonia attacks the interior, while the exterior is exposed to SO<sub>2</sub> gas. This latter chemical forms a sulphurous acid when combined with frost on the pipes.

But SPANG CW Pipe stands up to this at Kern. After 10 years of service, the SPANG Pipe is in excellent shape and has never leaked, despite these rugged conditions. Management at Kern counts on years more of *top-quality* service from SPANG.

That's the story of SPANG service at Bakersfield. It can do the same for you in any piping installation. Try SPANG CW Steel Pipe on your next job. Call your local SPANG Distributor.

### SPANG-CHALFANT DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis





## PORTFOLIO OF BIRD-ARCHER ENGINEERING SERVICES FOR WATER TREATMENT

For experienced counsel and personal attention to water or steam problems at your plant, it will pay you to call on Bird-Archer's qualified engineers. Highest quality chemicals and over sixty years experience assure maximum results with Bird-Archer's Complete Water Treatment Service.

### PLANT SURVEY

Studies of your use of water or steam equipment and past performance.

### WATER AVAILABILITY STUDY

Analysis of water supplies starting at source.

### LABORATORY SERVICE

Experienced chemists specialize in scientific water analyses and research.

### DEVELOPMENT OF TREATMENT AND CONTROL SYSTEMS

Operational changes where necessary.

### CHEMICAL TREATMENT FORMULATION

Bird-Archer custom formulates chemical treatments for your specific problems.

### EQUIPMENT RECOMMENDATIONS

Specification and furnishing of additional equipment when necessary, including complete analysis of savings and benefits made possible.

### PLANT STAFF INSTRUCTION

Experienced technicians instruct your personnel in accurate control and test procedures.

### PERIODIC CHECK-UPS

Personal call-backs to your plant by a Bird-Archer Service Engineer to assure best possible results.

### ENGINEERING PLUS CHEMISTRY EQUAL BIRD-ARCHER SERVICE

For Power. For Process. For Cooling.

WRITE FOR LITERATURE



## BIRD-ARCHER WATER TREATMENT

THE BIRD-ARCHER COMPANY, 4337 N. AMERICAN ST., PHILADELPHIA 40, PA.

NEW YORK • CHICAGO

IN CANADA: The Bird-Archer Co., Limited, Cobourg, Ontario

BIRD-ARCHER COMPANY OF CALIFORNIA, San Francisco

## Equipment, Supplies & Methods (Continued)

### Impact Nut-Running with Torque Control

A new air-operated Torque Control Impactool by Ingersoll-Rand Co., 11 Broadway, N. Y. 4, N. Y. makes it possible to run nuts with the great speed of an Impactool to a controlled torque. It will run a nut to any desired torque, then automatically shut itself off.



Running nuts on 1 1/4 in. soft steel studs to 370 ft lb torque. Size 534 OT Torsion Bar Torque Control Impactool.

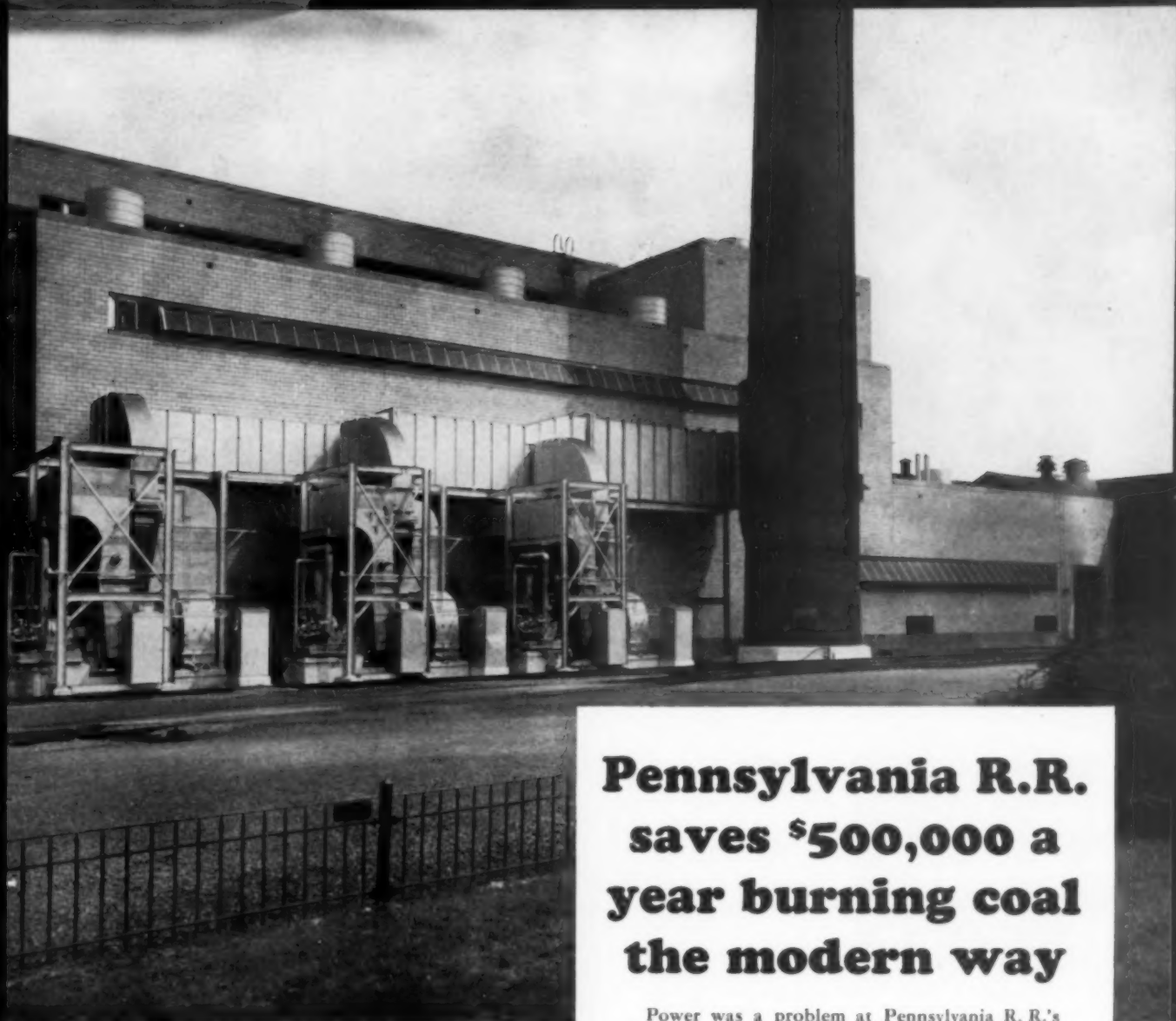
Design incorporates the torsion bar principle to torque control. While the nut is being run to required torque, the new Impactool operates at normal power and speed, but when required torque is reached and nut-running resistance is equal to the stress preset in the torsion bar, the impact mechanism rebounds instantly and trips a rubber-faced shutoff valve.

Other advantages include the following: the torque setting is simple; torque setting remains constant; torque control is consistently accurate; no need for pressure regulators; elimination of "over-torque"; reversible operation; and low maintenance.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See Pages 16-19





## **Pennsylvania R.R. saves \$500,000 a year burning coal the modern way**

### **Consult an engineering firm**

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

### ***facts* you should know about coal**

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

Power was a problem at Pennsylvania R. R.'s Juniata shops, part of its great Altoona Works. Low steam pressure was creating costly production delays; electric power failures meant additional delays; obsolete fueling methods resulted in troublesome flyash emission and other problems.

So Pennsy engineers consulted with Gibbs & Hill, Inc.—designers and constructors for the project—and modernized the power plant. Today three 60,000-lb.-per-hr. 600 psi coal-fired boilers supply steam to the shop area at 150 psi after it has driven two 1,500-kw turbine-generators. Between an adequate steam supply and reliable by-product electrical services, production delays have been eliminated. Air pollution is a thing of the past. Modernization of fuel handling has cut manpower costs. And today efficient operation plus lower fuel costs save Pennsylvania Railroad a half million dollars a year!

*For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.*

**NATIONAL COAL ASSOCIATION**  
Southern Building, Washington 5, D. C.

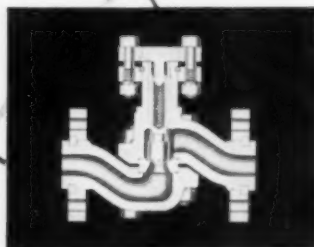
AROUND-THE-CLOCK

# RELIABILITY

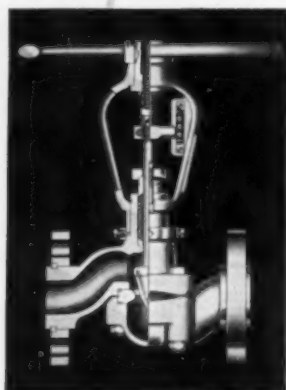
with

# Annin

*The complete line  
of Fluid Control Valves  
to meet every  
installation  
requirement.*



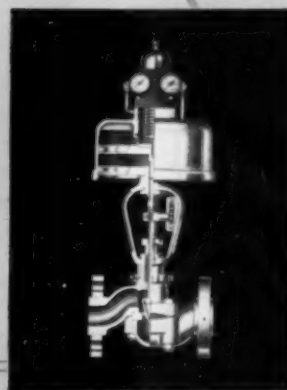
CHECK VALVE



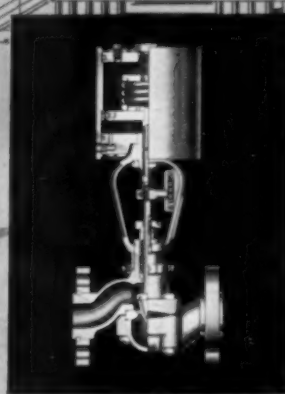
HANDWHEEL VALVE

Yes, Annin offers design and control engineers a complete line of valves for rugged and reliable performance "around-the-clock." Name the installation—rocket stand, aircraft component test facility, chemical plant, refinery, paper mill or power plant—and Annin valves will exceed the most critical performance needs, with features like:

- Piping flexibility
- Pressure ratings to 10,000 PSI
- Body designs for gases to molten metals
- Temperatures from  $-400^{\circ}\text{F}$  to  $+1600^{\circ}\text{F}$
- Interchangeable operators—Domotor, Cylinder or Handwheel



DOMOTOR VALVE



CYLINDER VALVE

ANNIN'S new and comprehensive valve catalog 1500-C is now ready for distribution. Send for your copy today.



# ANNIN

## Control VALVES

**THE ANNIN COMPANY**

6570 EAST TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

## Equipment, Supplies & Methods (Continued)

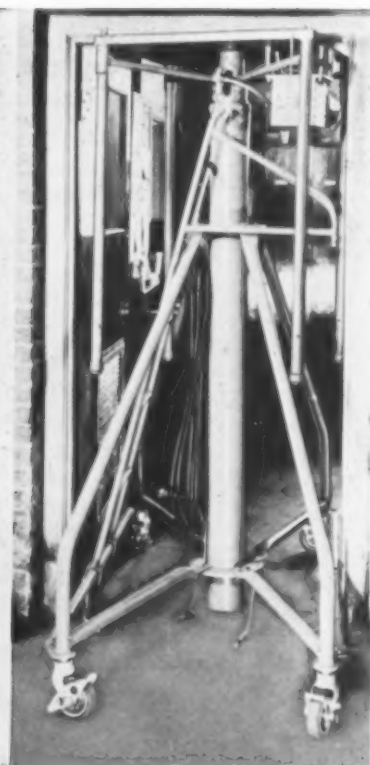
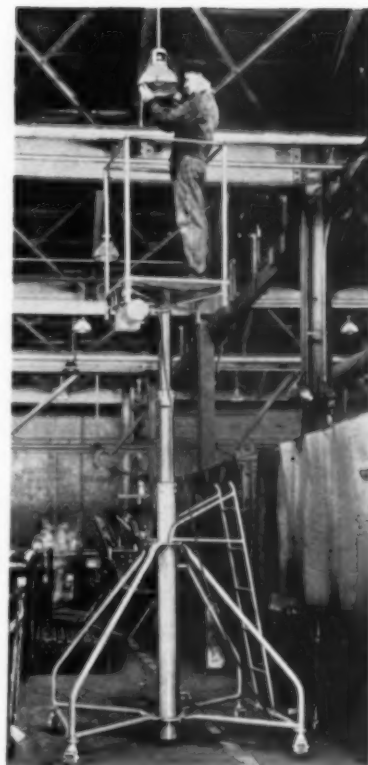
### Elevating Maintenance Tower

**E-11** An elevating maintenance tower that is small enough for a man to roll through doorways and big enough to service equipment 23 ft high is announced by **Safway Steel Products, Inc.**, 6234 West State St., Milwaukee 13, Wisconsin.

The versatile one-man tower is powered by an electro-hydraulic pump that can raise the work platform from 7 to 17 ft in 25 seconds. Operating from an 110 A/C outlet, the ML-4-AC Moto-Lift has 50 ft of heavy duty extension cable that permits overhead servicing around obstructions up to 100 ft before shifting to another outlet. Working load is 400 lb.

This telescoping electro-hydraulic tower is offered in addition to battery and hand operated models. The battery operated ML-3-DC is powered by a standard 12 volt automotive storage battery. The manual tower, HL-2 Hydro-Lift, works from a self-contained hydraulically actuated unit.

All three elevating lifts are operated from the work platform. Pressing a foot button on the platform



New Moto-Lift one-man tower has 30 x 30 in. platform which can be raised to 17 ft in 35 sec. Tower telescopes to clear low, narrow doorways only 7 ft high by 30 in. wide. Both wheel and swivel of each caster lock at the working location.

controls elevation of both the plug-in and battery operated towers. The hand operated Hydro-Lift is raised

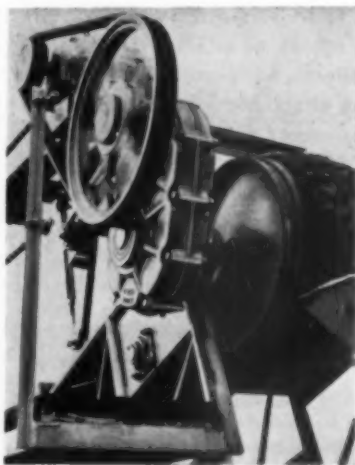
by reciprocating a hand lever. All models are lowered by stepping on a hydraulic release valve.

### Shaft-Mounted Speed Reducers

**E-12** With the recent addition of two models to its Torque-Arm line, **Dodge Manufacturing Corporation**, Mishawaka, Indiana, now offers shaft-mounted speed reducers, with capacities from 1 to 60 hp and output speeds from 12 to 365 rpm, which represents an increase of 40% in maximum rated horsepower capacity.

The new size No. 8, in the double reduction series, extends all the advantages of shaft mounting, plus the proven performance and economy features of Dodge Torque-Arm Speed Reducers, to big jobs. The No. 8 has a capacity of 60 hp at 100 rpm, AGMA rating, and can be mounted on shafts up to five inches diameter. At the other end of the Torque-Arm line is the new No. 11, with a capacity of 1.3 hp at 100 rpm.

These new sizes have all the in-



One of the new Dodge No. 8 Torque-Arm Speed Reducers on a 225 ft long belt conveyor. Reducer has a capacity of 60 hp at 100 rpm and can be mounted on shafts up to 5 in. diameter.

herent advantages of the Torque-Arm line. No foundation, no flexible couplings, no sliding base is required for any of these reducers, and there are no lining up difficulties. The reducers are mounted directly on the shaft, and the Torque-Arm is fastened to any fixed object, anchoring the reducer. The unit is driven through a V-belt drive. Dodge Taper-Lock Sheaves permit any speed ratio desired.

The Tri-Matic Overload Release, which loosens the belts, cuts off power and gives a warning in case of excessive load is available for use with any Torque-Arm Reducer. A built-in backstop may also be provided when conditions require a device to prevent the reversal of the direction of rotation.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

## Make Actuators Do Their Right Job

(Starts on Page 57)  
installing a new set. The rings recommended by the manufacturer should be used.

### Springless Actuators

This type of actuator (Fig. 3) uses a controlled pressure to replace the spring. If the force exerted by the unit being positioned is in the direction of the constant loading pressure and does not reverse, the loading pressure is made low. When the unbalanced force opposes the constant loading pressure, this pressure must be sufficient to position the stem as the variable pressure above the diaphragm is reduced to a minimum.

By use of a reversing relay and a positioner the pressures on each

side of the diaphragm may be varied. The springless cylinder actuator operates in a similar manner.

Use of the positioner and relay or constant loading regulator necessitate tubing between these units. All connections must be soaped for leaks. The relay or loading regulator must be given the same attention as the actuator. The small seats and needle valves must be clean and properly aligned. The cylinder or diaphragm actuator of the springless actuator is serviced in the same way as the spring-loaded type.

### Stem Positioner

Correct positioning of the stem of the actuator to correspond to the

controller output is obtained with a positioner (Fig. 4). This device will increase or decrease the pneumatic loading from zero to maximum supply air pressure until the stem assumes the correct position.

Although there are many different positioner designs, most of them have features in common that must be serviced:

(1) Positioner must be set correctly for existing stem travel. Most positioners have a scale for reference in making this setting.

(2) All air passages must be clear and relay valves clean and capable of positive shut-off.

(3) Stem movement sensing device, usually a spring, must be adjusted for correct relation between controller out-put range and stem movement.

(4) Connections, if any, between stem and positioner must be tight and aligned correctly.

(5) Flapper or other device which uncovers bleed nozzle must be aligned to the nozzle.

It becomes evident that servicing all of the points on this check list requires familiarity with the unit or reference to the instructions.

### Actuator Connections

The actuator cannot do its job of positioning a piece of equipment unless the connection to this equipment translates the stem movement of the actuator positively. Every improvement in the design of the actuator as well as the use of the positioner is prompted by the necessity for accurate positioning of valves, pump governors, dampers, variable speed units and all devices used to control a mechanical or chemical system. This accuracy is lost by a badly designed connection or even a good connection which is allowed to develop looseness or misalignment.

Proof of adequate servicing lies in operation. Evidence of correct operation is shown by the ability of the actuator to move a unit through its range of position with a change in controller output through its design range. Because the servicing procedures and suggestions discussed are very general, they apply to most actuators so it should not be difficult to apply them to the particular unit requiring attention.

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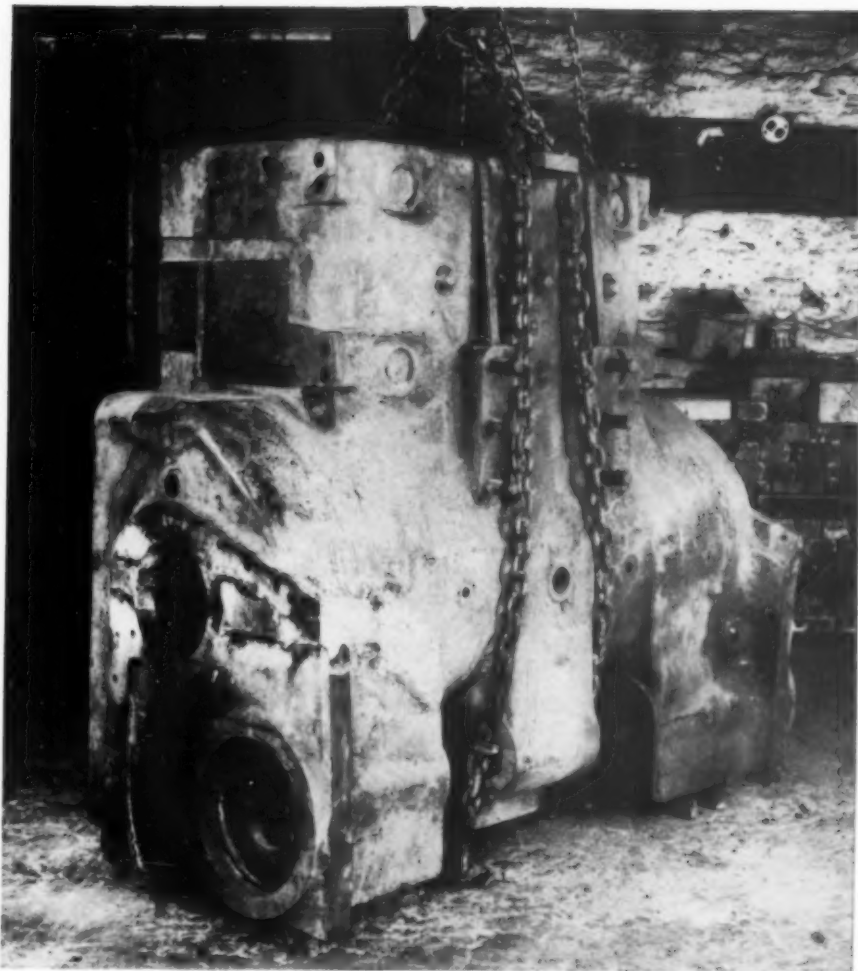




AN EXAMPLE  
OF



AT WORK!



## SIMPLE WELD GIVES GIANT CASTING NEW LEASE ON LIFE

This giant iron casting is the 2900 pound transmission case of a Caterpillar D-8 Tractor. When a serious crack developed, it was sent to an independent welding shop—The Superweld Company of Brooklyn, New York—for repair.

Because of its tremendous size and thickness, it was important that the repair be handled properly. Conventional welding materials would require a great deal of pre-heating which often causes warping, stress and embrittlement of the base metals. To avoid this "Low Temp"® EutecRod® 18FC was chosen.

The repair was made in the following manner: The case was thoroughly prepared by veing out the cracks for the full thickness of the metal. It was pre-heated *slightly* and filled with Flux Coated EutecRod 18FC. The completed joint required little machining and provided the strength and durability to put the casting into rugged operation again.

Mr. V. F. Reina, General Manager of Superweld, in describing this job, had this to say: "The use of EutecRod 18FC cut down the pre-heating which is ordinarily necessary for brazing so large a casting. In addition, it gave us the excellent tensile strength and tinning action we required."

These comments, from an independent job welding shop, are typical. Tough, even "impossible" repairs have been successfully completed with Eutectic "Low Temperature Welding Alloys"®, because each one has been designed to do a specific job. Weldors have discovered that the warping, stress and embrittlement of base metals associated with conventional welding materials, is minimized or completely eliminated with Eutectic "Low Temperature Welding Alloys" and the exclusive "Low Heat Input" metal joining process. They find that "Low Temp" EutecRods and "Low Amp" EutecTodes speed welding, save time and money.

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## Combustion Controls

(Starts on Page 68)

and the second will cause excessive oil carry-over which is detrimental to the control equipment.

The intake for the compressor should be taken from a cool and dry place so that a minimum amount of moisture is carried in the air. Likewise the air receiver and all low points in the compressed air headers should be provided with traps and drains, and the condensation at these points should be blown out regularly. The main filters for the supply to the control system should be inspected each six to twelve months and new filtering mediums installed if necessary.

### Connecting Piping

Two general classifications of connecting lines are used with a control system. The first is the pressure or differential pressure connections to metering or control units and the second is the piping used for transmitting the compressed air supply and the compressed air loading signals of the control system.

In order that the control system function properly, it is essential that both classes of piping be free of leaks and free of any restrictions which may be caused by metal chips, dirt, oil, water, or any combination. Brushing the joint of the compressed air piping with a soapsuds solution will quickly reveal any leak. The following schedule should be adhered to in keeping connecting piping clear:

(1) Steam pressure connections should have a five to ten second free blow under line pressure every three months to clean out any sludge in the line.

(2) Draft connections from the boiler to gages and controllers should have a free blow lasting at least one minute every three months. Use air of at least 50 pounds pressure. The lines should be disconnected from the controllers to prevent damage to any sensitive diaphragms and should be blown from the controller end of the line back to the boiler.

(3) Pressure connections made to fuel oil piping should be filled with Prestone, Ethylene Glycol or Glycerine to avoid sluggish response of gages or controllers due to congealed oil in the connecting piping. Separating chambers with try cocks are usually provided at the oil line connection and the piping should be checked every three months to make certain that the separating chamber and connecting lines to the gage or controller are filled with sealing fluid.

(4) Settling chambers in the compressed air piping and drain cocks on the compressed air receiver and filter housings should be blown free of moisture at least once each day.

### Controllers

The stems, seats, and ports in the air pressure reducing valves, the pilot valve and the relay valves or nozzles may require periodic cleaning if the compressed air supply is not properly filtered and if excessive carry-over of oil is obtained from the air compressor. Before attempting to disassemble or clean any part of the controller always read the manufacturer's instruction completely and carefully so that the correct procedure will be followed.

Air cylinders in control drives should either be lubricated with a light grade of mineral oil every three or four months or they should be dismantled and greased with brake cylinder lubricant every six months to one year. In the latter case no oil is used.

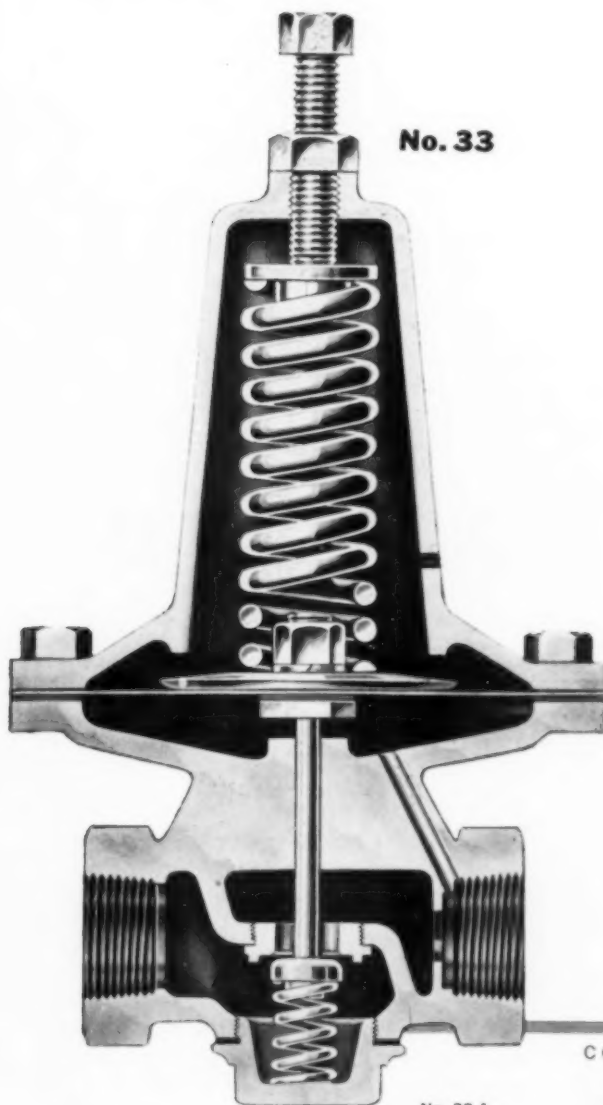
Linkage between the air cylinders and the dampers, rheostats or other devices being controlled need regular inspection and lubrication. Damper blades and bearings, rheostat bearings and brushes, turbine valve gearing and other devices actuated by the control drives should have regular inspection to see that these devices are functioning properly and that they are operating through the proper range for full stroke of the control drive.

### Original Adjustments

In general, best results will be obtained with the control system if the original adjustments are not changed. Ordinarily, the manufac-

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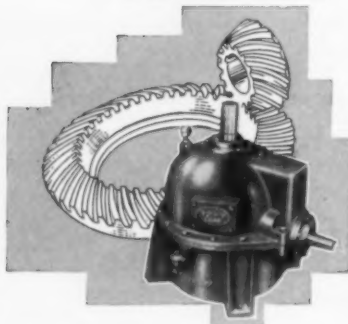
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turer's representative has adjusted the various components to give best operation of the control system and these adjustments should be maintained. Never experiment with the adjustments of the controllers, relays, or power devices without first making a careful and complete study of the manufacturer's instructions covering the unit.

## Prefab Insulation

(Starts on Page 70)

Lay-out tables, templates and cutting wheels are necessary tools for the economic fabrication of prefabricated insulation.

The problems of fabrication are more simplified since pipe, valve and flange sizes have become standardized. Shop fabrication facilitates cost reduction methods, improves material selection and encourages design improvements. This program also increases the speed with which insulation can be applied in the field with less expense to the company.

A knowledge of the insulating materials available on a commercial basis and the capabilities and limitations of each is essential to personnel concerned with insulation. Too frequently, reliance is placed on one or two types of materials, where the selection and application of other types of insulation would be sounder from an engineering standpoint. The handling properties as well as the insulating properties must be considered.

Another consideration is that of surface durability of the material. Nearly all insulating materials are punctured or torn sometime during normal life. The insulation may become wet, lowering the insulating properties and/or weakening it structurally.

Costs involved in purchasing insulating material, providing storage space, preparing it for application plus the final labor charges for installation are frequently more than the cost of the equipment which is being insulated. This, however, is not the end of these costs.

As subsequent maintenance of the equipment is required the insulation may be removed and discarded. More money must then be spent for the purchase and installation of more insulation. Obviously, this increases the costs of maintaining process equipment.

It may occur that the process equipment is returned to service prior to the reinstallation of the insulation. Subsequent operation of the equipment may not be reliable from a control standpoint or an unscheduled outage of the equipment may result. These factors also affect operating costs.

In summary, development and use of removable and reusable types of insulation have become necessary as a result of many factors, three of which are:

1. The increase in the availability of materials suitable for reuse.
2. Increased labor costs involved in the application of conventional insulating methods.
3. Increased production rates which permit less outage time for completing maintenance repairs.

Industry in surveying potential savings available for reducing operating and maintenance costs should not overlook insulating materials and techniques.

## Southern Progress

(Starts on Page 51)

6,100 new employees and went on the lines of the Alabama Power Company. Two new electrical equipment firms added another 460 employees here.

In Louisiana, the home of Louisiana Power & Light Company, the chemical industry completed 40 million dollars worth of construction projects in 1955 — and will complete an additional 69 million dollars worth in the next two years. During the last two years, 920 new jobs were created in the electrical equipment field.

During 1954 and 1955, eight top-flight American manufacturers of electrical machinery and equipment invested in the future of the service area of Duke Power Company — firms such as General



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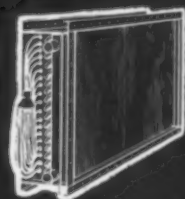
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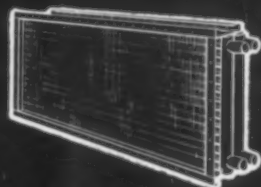
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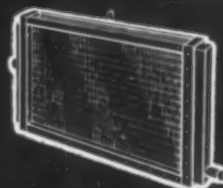
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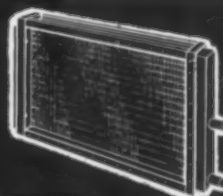
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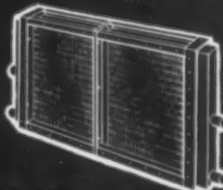
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## Southern Progress Report (Continued)

Electric, Western Electric, Sanguamo Electric, Superior Cable.

And if you happen to get carried back to "old Virginny" these days, you'll find Virginia Electric and Power Company serving 9 new electrical equipment plants with over 1,800 employees and 7 recent additions producing forestry products with over 800 employees.

And just listen to this one: The petro-chemical industry, in just two plants on Gulf Power's lines, will employ 5,200 people in plants that were still on drawing boards 3 years ago.

There is every reason to believe that the vast petro-chemical industry is still in its swaddling clothes. The petroleum industry has invested about 2½ billion dollars in this baby, and it's getting some expensive care and feeding. One company alone, the Standard

Oil Company of New Jersey, spends 30 million dollars per year on research — much of it on petrochemicals. Among the more important developments are plastics, detergents, synthetic rubber, insecticides, solvents, synthetic fibers. Among the lesser known products containing petrochemicals are cosmetics, pharmaceuticals, lingerie, paints, anti-freezes. In Baton Rouge, Louisiana, the Esso Company alone makes 700 different products.

To keep up with rising demand, the petroleum industry spent over 25 billion dollars for expansion in the 8 years ending with 1954. An important proportion of this investment was made in the South.

A recent report issued by an investment firm states that the annual sales volume of petrochemicals has doubled since 1950

to nearly 4 billion dollars. Did you know that 25% of all chemicals made in this country come from oil and gas? One leading oil man predicts that by 1966, 50% of all chemicals made in this country will come from oil and gas.

On January 30th of this year, the Manufacturing Chemists Association released a forecast of new chemical construction spending by states. The total of projects completed in 1955, plus those under construction or definitely planned for completion within the next 2 years, reaches 2.3 billion. If you line up the states in order of new chemical construction, you find 4 of the top 7 are in the Southeast: following Texas, first; California, second; and Ohio, third; and then comes Louisiana, West Virginia, Georgia, and Florida in that order.

The state of Louisiana alone, produces 11% of the nation's petroleum, and 15% of the natural gas. Add to this 33 million barrels produced in Mississippi. Another 700 million barrels is produced annually in Venezuela and marketed in the United States, Canada and Latin America. About 7% of the entire world estimated reserves of crude are in Venezuela.

And while I am on the subject of South America, give a thought to this vast market for goods and services. The South is most favored by the very nature of things — by geography — to supply goods and services to Latin America and the Caribbean area. Here, too, the "last half of the 20th Century belongs to the South." There are an estimated 220 million people in this area, and the rate of population growth is higher than that of the United States — an increase of over 30% between 1940 and 1955 while the United States was increasing 25%.

Let's move on to another big reason that the "last half of the 20th Century belongs to the South" — our timber reserves. Perhaps the word timber "crop" is a better one to use than "reserves." The most gratifying fact is that statistics show that Southern pine grows two to three times as fast as Northern trees. A new source of income is unfolding to the former cotton

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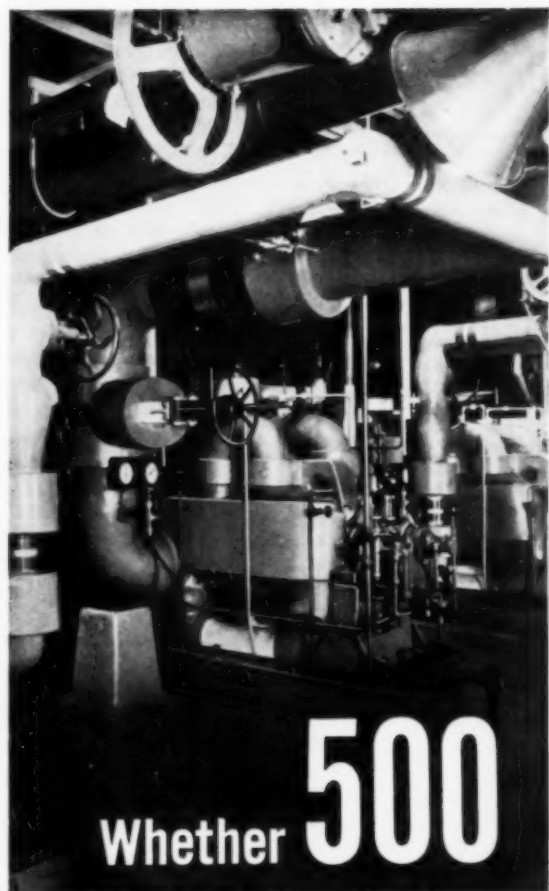
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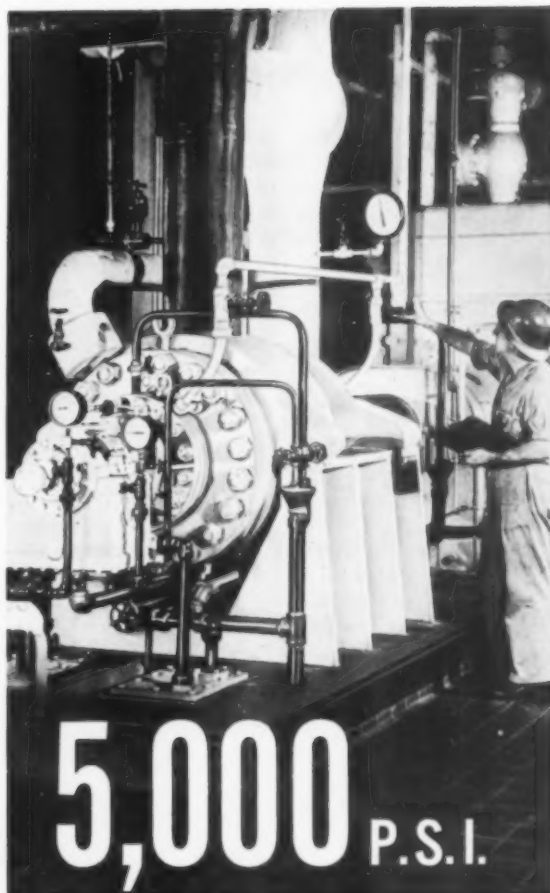
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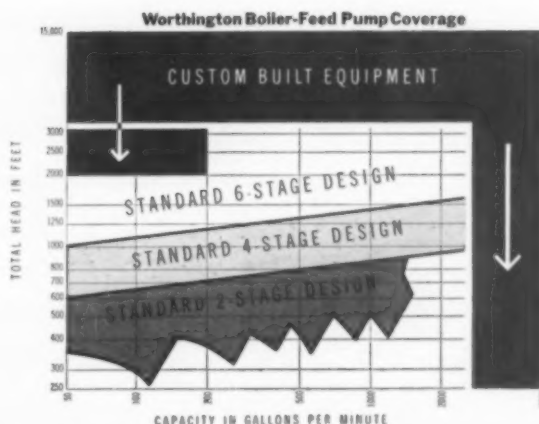
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# WORTHINGTON



SOUTHERN POWER & INDUSTRY for MAY, 1956



**WORLD'S BROADEST LINE OF BOILER FEED PUMPS**

## Southern Progress Report (Continued)

farmer — planned annual replanting of his timber crop. Manufacturers have found pulp made from Southern pine so far superior to that produced from Northern woods.

And of course, there are the cellulosic fibers. Rayon development in the South was almost inevitable, utilizing cellulose in the form of cotton and wood pulp. In 1954 more than 70% of the nation's cellulosic fibers came from 19 plants scattered throughout 8 Southern states. Almost half of the nation's 28,800,000 textile spindles are located in the Carolinas, add Georgia and it is about two-thirds.

The Carolinas and Alabama have scarcely tapped their forests — and they have timberland covering about 50% of their land area. All Southern states have reforestation programs to assure a continuous supply. The South is an im-

portant market for goods and services in its own right. Per capita income is four times what it was 25 years ago, and in that period it has climbed from 44% of the national average to 64%.

In January of this year, the U. S. News and World Report printed a study of "How the South Is Changing Industrial America." This study states that "the new folding money, rustling in Southern jeans, is the reason why 80% of the new factories in the South have been built to fulfill the needs of Southerners exclusively.

My granddad would turn over in his grave if he knew that in the United States, in 1953, more cotton was produced outside of the South — in other states — than in the South. In that statement Texas and Oklahoma are classified as Southwestern states. California produced more cotton than any

state except Texas and Mississippi — it produced more than Alabama and Georgia combined. We welcome this diversification and those cotton-pickin' Westerners are welcome if they'll send us a few aircraft and electronics firms in exchange.

Electrical equipment and electronics manufacturers recognize the Southern opportunity — the market as well as the manpower pool. The Association of Consulting Engineers must have been thinking of this growing industry, in particular, when they reminded us that "obsolescence means something quite different from wear and tear—it means that something better is available.

They find "something better" in the South . . . rapidly expanding markets and favorable conditions for a new plant. The volume in electronics has grown from about 300 million dollars in 1939 to nearly 7 billion dollars in 1952. Frank Folsom, president of R.C.A. says it will reach nearly 14 billion dollars by the end of 1957.

One of the essential ingredients to expansion in this industry is qualified technical and professional personnel. For many years, the engineering graduates of our Southern colleges and universities have migrated to the North and Mid-West to pursue their profession. Now opportunity is coming to them. A recent study by the U. S. Department of Labor attempted to identify the industries with serious shortages of research scientists and engineers. The largest shortages found — were in these 6 industries: aircraft, electrical equipment, petroleum, paper (wood), food, and primary metals.

I have been talking about three of these — electrical equipment, petro-chemicals and wood . . . all three market-oriented industries for the South. Any self-respecting citizen of Atlanta will remind me quickly that Lockheed Aircraft Corporation paid 72 million dollars to 15,500 employees in Atlanta in 1954; so who will rule out Aircraft production? Incidentally, I've been told that 65% of the nation's aircraft industry is concentrated in Los Angeles County, California. If this is so (or even if it is only

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half of that) it seems to me our national defense planners have been very accommodating to our potential enemies in presenting them with such a juicy opportunity to deal our country a crippling blow. I question whether such concentration is in the best interest of the industry and the nation, economically or from the stand-point of national defense.

The citrus and vegetable producers of my own state would tar and feather me if I inferred any lack of opportunity in the food industry. And I'd hear from Birmingham if I ruled out primary metals. These industries need skilled employees as well as technical and professional men.

They are finding them in the South.

During the coming decade, says The Southern Association of Science and Industry, ten thousand more plants will be built in the South. In the ten years, 1944-1954, manufacturing establishments in the Southeast increased from 33,000 to 48,000 — an increase of 15,000 establishments. The market is here and growing; the South has incomparable human and natural resources. Ten thousand more plants in a decade, they say — who is going to argue with them? . . . and on what grounds?

## Expansion Brief

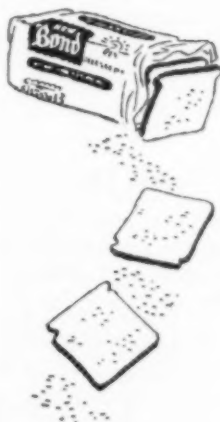
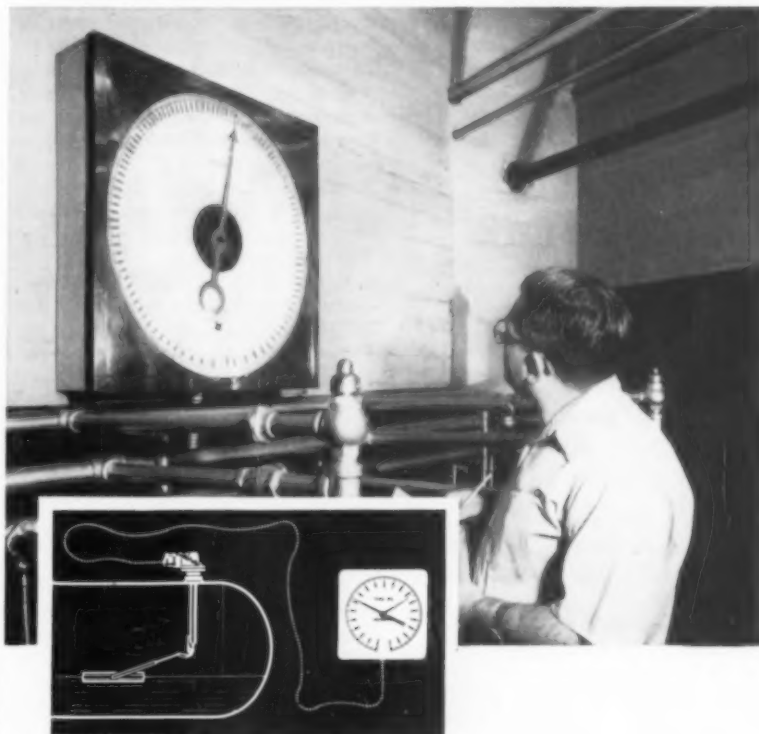
### Diamond Alkali—Houston

Diamond Alkali Company plans to expand its perchlorethylene production at its Deer Park Plant at Houston, Texas, to double present capacity.

It is anticipated that this expansion will be completed by January, 1957, since the design and engineering phases are already nearly finished. Construction will start in the immediate future.

This multi-million-dollar project, to be located in a new area of the plant, will be laid out to provide for future expansion of the Chlorinated Products Division's activities, both by increasing the capacity of the present products and the addition of new units for new products as they are developed.

## BAKING PLANT RECEIVES 29 YEARS OF TROUBLE-FREE GAUGING



Reliability is a *must* in industrial gauging. That is one reason why Liquidometer quality gauges are specified in a wide range of industries where liquids are stored and measured.

The Liquidometer gauge installation at General Baking Company's Brooklyn plant is typical. It takes close to 7000 gallons of fuel oil per week to run the baking ovens, generate steam and heat the plant. Here, the important job of fuel gauging has been successfully performed by the same Liquidometer Senior gauge uninterruptedly for 29 years.

Dependability, low-maintenance, high readability, safety and ease of installation suit Liquidometers for your liquid gauging needs.

A variety of dial type Liquidometer gauges are available for direct and remote indication. For complete details write Dept. F for Bulletin 463.



*Liquids worth storing are worth measuring*

**THE LIQUIDOMETER CORP.**

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provide controlled  
and dependable  
conduction, convection  
or radiant heat

These versatile Chromalox Tubular Heaters provide the kind of heat you need, exactly fitted to your specific heating application.

Available in straight lengths or formed to any desired shape. Used for heating dies, molds, platens; as immersion heaters in liquids, soft metal and molten salts; or in ovens, air ducts and other air heating applications.

Let the Chromalox Sales Engineering staff solve your heating problems . . . electrically

Write for your copy of  
Catalog 50

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For ideas on additional applications of electric heat, request Booklet F1550—"101 Ways to Apply Electric Heat."



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A-4466A

SALES ENGINEERING REPRESENTATIVES—Atlanta 9, Ga.—C. B. Rogers and Associates, 1000 Peachtree St., N.E.; Charlotte 2, N. C.—Ranson, Wallace & Co., 116½ East Fourth St.; Dallas 26, Texas—L. R. Ward Co., 3009-11 Canton St.; Houston 3, Texas—L. R. Ward Co., 1814 Texas Ave.; Nashville 4, Tenn.—H. B. Miles and Associates, 2500 Franklin Road.

## News for the South & Southwest (Continued)

### Cameron & Barkley Add Grinnell & Carter Lines

The Cameron & Barkley Company, distributor of industrial supplies with branches at Charleston, S. C., Savannah, Ga., Jacksonville, Orlando, Tampa and Miami, Fla., has been appointed a stocking distributor for Grinnell pipe hangers and supports, and will also handle the entire Ralph B. Carter Company line of self-priming centrifugal pumps, single and double diaphragm pumps and high pressure pumps.

In becoming a Grinnell distributor, Cameron & Barkley takes on a line which includes pipe hangers and supports for all types of pipe installations, whether for standard applications or where construction details or piping arrangement make it necessary to deviate from standard types of hangers or supports.

Another recently announced Cameron & Barkley appointment is that of Hugh S. Kimball as Sales Manager.

Mr. Kimball, a graduate of The Citadel in Charleston, S. C., joined Cameron & Barkley in 1941 as a salesman. His broad experience in sales and operations ideally qualifies him for this new position, created to meet the demands of Cameron & Barkley's greatly increased business activity.

Mr. Kimball will make his headquarters at C & B's Jacksonville branch, most centrally located of the Company's outlets.

### Beaver Pipe—Kansas City

Beaver Pipe Tool, Inc., Warren, Ohio announces the appointment of Gordon Burke as District Manager of their Kansas City sector. This includes Missouri, Kansas, Nebraska and Iowa. Headquarters are in Kansas City.

### Detroit Stoker—Philadelphia

John Dick has been named district manager of Detroit Stoker Company's Philadelphia office with headquarters at 1203 Morris Building, 1421 Chestnut St., Philadelphia 2, Penna. He succeeds John L. Bainbridge, recently appointed district manager of the Cleveland office.

### Robert Cheek to Head New Westinghouse Electronics Dept.

The formation of a new department in Baltimore for the manufacture of a line of industrial electronics products has been announced by Westinghouse Electric Corporation.

Robert C. Cheek, formerly assistant manager of the company's Baltimore electronics division, has been named manager of the industrial electronics department.

The plant facilities in Baltimore will be located at Eagle and Smallwood Streets. The department, which will employ about 115 persons, will be responsible for the engineering, manufacture and sale of induction heating equipment, power line carrier equipment and a variety of other industrial electronic devices.

A native of Charleston, S. C., Mr. Cheek joined the Westinghouse student training course in 1939 following his graduation from Georgia Institute of Technology. From 1942 until 1951, he was a consultant on power systems problems and subsequently acted as a specialist in carrier and microwave applications all over the country. In 1951, Mr. Cheek was transferred to Baltimore as assistant sales manager for the electronics division. He was appointed assistant division engineering manager in 1953.

### Quiggin Joins Washington Office of Cooper-Bessemer

The Cooper-Bessemer Corporation recently announced the appointment of F. W. Quiggin to the Washington District office.

Working under the direction of Charles G. Cooper, Vice-President and District Sales Manager of the Washington and Southeastern territory, Mr. Quiggin will be responsible for the engineering and sales of engines and compressors in that territory.

Mr. Quiggin is an engineering graduate of the North Gloucestershire Technical College and the Royal Air Force School of Aeronautical Engineering, both of England. He became associated with Cooper-Bessemer in 1948 as a mechanical engineer in the Engineering Department and was transferred to the Sales Department in 1955.

## Georgia Power's 60,000 kw Hydroelectric Plant & Dam

The Georgia Power Company recently made application to the Federal Power Commission for a license to construct a 60,000 kw hydroelectric plant and dam on the Chattahoochee river just north of Columbus, Georgia. The development, which will cost more than \$13,000,000, will be known as the James McCoy Oliver dam and will form a part of the company's Middle Chattahoochee development.

The application calls for a powerhouse containing four generators. The original estimates for the plant a year ago had called for three generators with a capacity of 48,000 kw. The changes in construction plans will increase the cost from an originally estimated \$11,000,000 to \$13,000,000.

Oliver dam, to be located at the historic Clapp's Factory site just north of the city limits of Columbus, is named for James M. Oliver, vice president and general manager of the Georgia Power Company, in recognition of his great contributions to the growth and development of the organization. Mr. Oliver is a veteran of 40 years of service in the public utility industry. A native of Dadeville, Alabama, he was graduated from Alabama Polytechnic Institute in 1915 with the degree of Bachelor of Science in electrical engineering. He joined the Alabama Power Company upon graduation, serving in various engineering capacities. He came to Georgia in 1927 as operating manager of the Georgia Power Company. In 1944 he was named vice president in charge of operations, and in 1951, vice president and general manager.

The Oliver dam will be 75 ft high and 2,021 ft long. It will impound a lake 8½ miles long, extending to the foot of Goat Rock dam and covering approximately 2,400 acres.

The three plants in the Middle Chattahoochee development will fully utilize the head of 178 ft between the City Mills pond in Columbus and the foot of the Bartletts Ferry dam 15 miles upstream. They will have a combined electric generating capacity of 92,900 kw, and will produce 470,000,000 kwh in a normal water year. Oliver dam alone will produce 255,000,000 kwh.

Harllee Branch, Jr., president of the Georgia Power Company, stated that the Middle Georgia development will contribute toward the full utilization.



## "Active air"... good for everybody!

More and more Emerson-Electric ACTIVE-AIR exhaust fans are being installed in shops, factories, showrooms, laboratories, foundries, and institutions, because active air is good for everybody.

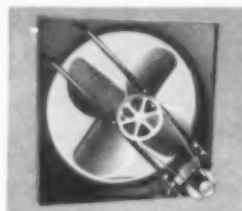
So—wherever there's excessive heat, stale air, excessive moisture, odors, smoke, fumes, install Emerson-Electric ACTIVE-AIR exhaust fans. Quality products for 65 years, the line is complete—there are types and sizes to meet a wide range of needs. All have balanced blades and are driven by powerful, lifetime motors. They quietly move large volumes of air—up to 19,400 c.f.m.

Get Emerson-Electric ACTIVE-AIR Fans designed for commercial and industrial service.

Write for Catalog Number 2058, THE EMERSON ELECTRIC MFG. CO., ST. LOUIS 21, MO.



Direct-drive single-speed exhaust fans with automatic shutters attached—three sizes, 12", 16", and 18"—up to 2,700 c.f.m.



Belt-drive exhaust fans—five sizes, 24" to 48"—up to 19,400 c.f.m. (New design 30" fan illustrated.)

# Emerson-Electric

of St. Louis • Since 1890



## News (Continued)

### Firestone Building Orange, Texas, Plant

Purchase of a 1,000-acre industrial site by **The Firestone Tire & Rubber Company** for the manufacture of petrochemicals in **Orange, Texas**, was recently announced.

First unit of this center will be a 40,000-ton-capacity butadiene manufacturing plant which will provide Firestone with a substantial portion of the butadiene requirements of its synthetic rubber plants at Lake Charles, Louisiana, and Akron, Ohio. Construction of the new plant is scheduled to be started in May.

The new butadiene plant will obtain its principal raw material, butane, directly from a network of pipelines throughout Texas. It will be one of the largest industrial users of Gulf States Utilities Company power. The Catalytic Construction Company of Philadelphia has the design and construction contract.

### Morse Chain Acquires Eberhart-Denver Co.

Stanley J. Roush, President of the **Morse Chain Co.**, a Borg-Warner subsidiary, has announced the acquisition of **Eberhart-Denver Co.** of Denver, Colo., and its affiliate, the **Spreco Co.** of Chicago. Eberhart-Denver Co. is one of the country's leading manufacturers of speed reducers.

Eberhart-Denver presently manufactures a complete line of worm gear speed reducers, double reduction worm speed reducers, single reduction helical gear speed reducers, screw conveyor drives and gear motors.

"The acquisition of Eberhart-Denver," Mr. Roush said, "is a major step in the growth and expansion program for Morse Chain in the industrial field. It will permit us to supplement and round out our present line of power transmission products which at present include roller and silent chain drives, flexible shaft couplings and drive shafts, over-running and friction clutches. It will enable us to expand our market potential in all areas where power

is to be transmitted from a power source to driven equipment."

**Fred Eberhart**, founder of Eberhart-Denver Co., becomes Chairman of the Board. **Stanley J. Roush** will be President. **Robert Bass** will serve as Vice President & General Manager. **John R. Mueller** will continue as Vice President and Chief Engineer.

### Carbide & Carbon Expanding Seadrift, Texas, Plant

Another step in **Carbide and Carbon's** major ethylene oxide expansion program was recently announced. Provision for the additional production of 65 million pounds of ethylene glycol per year is being made at the **Seadrift, Texas**, plant. This extra capacity, announced less than a year after start-up of the original plant, brings total capacity for ethylene oxide in this single plant to more than 200 million pounds per year.

### Fisher-Pierce Missouri Repr.

The **Fisher-Pierce Co., Inc.**, manufacturers of photoelectric lighting controls, will be represented in the **St. Louis - Kansas City** area by **William & McKinley Sales Co.** A. V. Williams and P. H. McKinley, of the Baltimore Building office in Kansas City, and R. H. Harper of 104 West Glenwood, Kirkwood, Mo., are the individual representatives.

### El Paso Electric Expansion

**El Paso Electric Company** has authorized **Stone & Webster Engineering Corporation** to proceed with the construction of Unit No. 6 at the **Rio Grande Station**.

The unit will consist of one 44,000 kw preferred standard turbine generator which will be supplied with steam at 850 psi gage, 900 F from a gas or oil fired steam generator capable of producing 470,000 lb of steam per hour.

Cooling water towers will be required and, in turn, will be supplied with water from deep wells. A centralized control room which will enable a minimum of operators to control the entire station output will also be a part of this program.

# FLEXCO



## BELT FASTENERS and RIP PLATES

FOR HEAVY  
CONVEYOR  
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BELTS OF  
ANY WIDTH

- ★ FLEXCO Fasteners make tight butt joints of great strength and durability.
- ★ Trough naturally, operate smoothly through take-up pulleys.
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- ★ Also Promal top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-112

**FLEXIBLE STEEL LACING CO.,**

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**George Ogden Gen. Sls. Mgr.  
of Fulton Sylphon Division**

The appointment of **George L. Ogden, Jr.**, as general sales manager of the **Fulton Sylphon Division**, Robertshaw - Fulton Controls Company, **Knoxville, Tennessee**, was recently announced.

Joining the company in 1940, Mr. Ogden held various positions at Knoxville until 1944, when he was transferred to the Detroit Sales Office. In 1948 he became Detroit district sales manager. Returning to Knoxville in 1953 he was appointed assistant general sales manager.

**Houston District Office for  
Columbia-Southern Chemical**

Continued growth of the Houston area as a heavy chemical consumer has resulted in **Columbia-Southern Chemical Corporation's** decision to establish a district sales office here.

According to **Chris F. Bingham**, vice president in charge of sales for the corporation, Columbia-Southern previously operated in Houston as a branch office of the Dallas district.

**Kay C. Ballard** has been appointed district sales manager for the Houston office. A native of Mineral, Texas, Mr. Ballard has been associated with Columbia-Southern since his graduation from Texas College of Arts and Industries (Kingsville, Texas) in 1934.

Mr. Ballard joined the firm as a laboratory chemist at the Corpus Christi plant during 1934 when the plant went into operation. During his eight year term at the plant he also served as a development engineer, assistant superintendent caustic department and finally as superintendent of the caustic and chlorine departments.

When Columbia-Southern acquired its large plant at Lake Charles, Louisiana, during 1946 and converted the facility to a chlorine-caustic soda manufacturing plant, Mr. Ballard served as chief process design engineer.

Later, he was appointed assistant plant superintendent and from 1949 to 1954 as works manager for the large Louisiana plant. During the past year, he has been manager of production for Columbia-Southern at the firm's general offices in Pittsburgh, Pennsylvania. **W. J. Bramblett** will serve as assistant district sales manager.

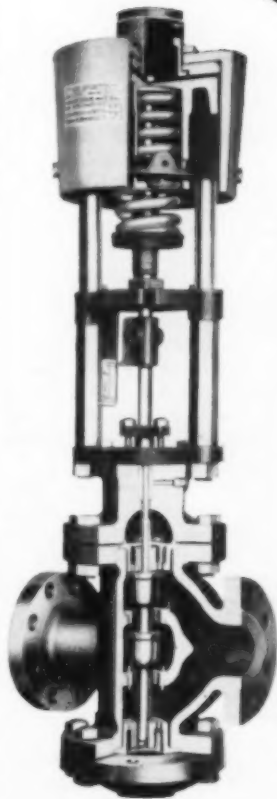
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THE NEW **FOSTER**

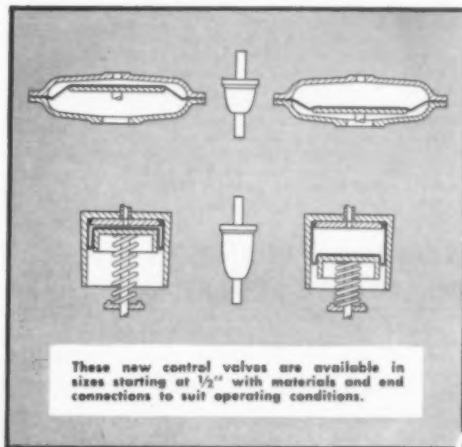
CONTROL VALVE WITH

**ISOFORCE** ACTUATOR

*Gives you greater sensitivity*



... because the Foster Bellofram construction gives you longer travel than other diaphragm actuated types — allowing for increase in length of main valve for more sensitive throttling action.



These new control valves are available in sizes starting at 1/2" with materials and end connections to suit operating conditions.

*For complete technical information, ask for Bulletin CV-1*



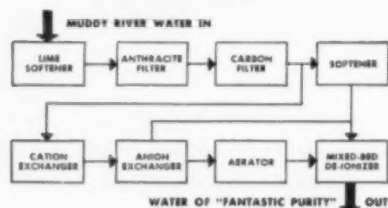
**FOSTER ENGINEERING COMPANY**

835 LEHIGH AVENUE, UNION, N. J.

- AUTOMATIC VALVES
- CONTROL VALVES
- SAFETY VALVES
- FLOW TUBES



## HOW TO UN-MUDDY THE WATERS



This block diagram shows a typical arrangement for a power company steam plant that must draw its boiler feed water from a nearby muddy river. The Lime Softener takes out suspended solids, turbidity, alkalinity, and organic matter; the Anthracite Filter removes any remaining turbidity; the Carbon Filter removes the chlorine; the Softener provides process water; the Cation and Anion Exchangers remove the dissolved solids such as carbonates, sulfates, and chlorides; the Aerator takes out most of the CO<sub>2</sub>; and the Mixed-Bed De-ionizer eliminates the remaining 4 or 5 ppm of solids, silica, and 5 ppm of CO<sub>2</sub> — to produce water of "fantastic purity."

## ILLCO-WAY PIONEERS IN PRACTICAL EXPERIENCE

Illinois Water Treatment Company designs and builds complete, practical, workable systems such as that shown above — to operate economically on a cost-reducing basis. This work is based on a wealth of practical knowledge gained through constant experience in the specialized field of ion-exchange, starting from the time that the first workable resins became available.

Remember ILLCO-WAY—foremost in the field of ionXchange.



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## News for the South & Southwest (Continued)

### Moore-Handley Expands Machine Tool Department

Moore-Handley of Birmingham, Mobile, Nashville and Chattanooga has appointed **Ted C. Ruzicka** as Machine Tool Sales Manager.



Ted Ruzicka

Mr. Ruzicka has had 11 years experience in servicing and selling machine tools. A native of Cincinnati and graduate of Ohio Mechanics Institute, he worked through the shops at Acme Machine Tool and for three years was outside service representative. He has had a broad experience in the application and sales of machine tools in the South-eastern States.

In his new responsibility, Mr. Ruzicka will have charge of Moore-Handley's Machine Tool Sales Organization covering the states of Tennessee, Alabama, Northwest Florida and part of Mississippi.

### F. E. Myers—Southwest

Elmer H. Cook, formerly product manager for industrial pumps, has been named district manager for Texas, Louisiana, Arkansas, Mississippi and Oklahoma, for The F. E. Myers & Bro. Co., Ashland, Ohio.

Myers manufactures water systems, pumps, power sprayers and water conditioning equipment.

Cook is replacing **L. R. Raudebaugh** who has resigned his position to take over the Texas Pump and Supply Company, in Dallas, Texas. Texas Pump and Supply Company is a distributor for Myers products.

### New Generating Plant for Houston Lighting & Power

Plans for construction of a large new electric power generating plant in Fort Bend County were recently announced by **Houston Lighting & Power Company**.

The plant is to be built on a tract of approximately 3,700 acres about 10 miles southeast of the Richmond-Rosenberg, Texas area, and includes Smithers Lake, which will have an important role in the new plant's operations.

Capacity of the plant's first generating unit will be 165,000 kw. Construction is scheduled to begin in April of this year, with initial operation planned for April, 1958.

To provide for the projected ultimate capacity of the plant of approximately 1,000,000 kw, construction plans call for enlargement of Smithers Lake from its present storage capacity of 4,000 acre-feet of water to a capacity of 16,500 acre-feet. Depth will be increased from the present average of 3½ ft to about 10 ft. Construction of a new earthfill dam and spillway across the present lake outlets, together with a dike along the low north shore of the lake is planned.

Construction at the new plant would get underway about the same time that the first unit at the Company's new Sam Bertron plant begins operation two months from now. Installation of the Bertron plant's second generating unit also is scheduled to begin in April of this year. The three new generating units of 165,000 kw capacity each will increase the Company's total system capacity from the present 1,256,000 to almost 1,750,000 kw in 1958.

### Electronic Computing—Dallas

Temco Aircraft Corporation, Dallas, Texas, has named **E. C. Curry** to head a new planning group designed to promote new utilization of the company's electronic computing and recording equipment. The new Data Processing Planning Group will help keep the company abreast of the most recent development in the use of electronic equipment in modern business.

## Rockwell Mfg. Acquires Kansas Metalworking Plant

Rockwell Manufacturing Company has acquired the assets of Locomotive Finished Materials Company of Atchison, Kansas.

The 84-year-old Kansas concern—also known as LFM Company will continue under its present management as a major division of Rockwell.

LFM, with almost half a million square feet of production facilities in Atchison and in St. Joseph, Mo., has the largest steel foundry and machining facilities west of the Mississippi River. It casts, machines and assembles a large volume of equipment for the petroleum industry—also for the railroad, machine tool, mining, power, and other industries.

The new acquisition will mark Rockwell's entry into the business of producing such items as special machinery of complex heavy design, rock-crushing machinery, centrifugal pumps, oil field and power plant equipment.

## Hammel-Dahl Co.—St. Louis

"The Hammel-Dahl Company of Providence, R. I., manufacturers of automatic control equipment, has announced the appointment of The E. B. Miller Company, 6636 Clayton Road, St. Louis 17, Missouri as their new sales representatives in that territory.

Mr. Everett B. Miller, in charge of this new organization, is very well known to the users of automatic control equipment, having been associated with the Foxboro Company since 1935. He has been actively engaged in sales and service in those cities for the past 20 years.

## Parker O-Ring Virginia Distributor

Franchisement of Specialties, Inc., 1406 Leslie Avenue, Alexandria, Virginia, as distributor of Parker synthetic rubber o-rings for sealing applications has been announced by the Parker Appliance Company, Cleveland, Ohio.

Technical assistance on selling applications will be available to the new distributor as needed from R. B. Jewett, Parker district manager in Philadelphia.

**FOR DIXIE  
CONSTRUCTION**

**DIXISTEEL**  
TRADE MARK  
**FABRICATED CONCRETE REINFORCING BARS**

## FABRICATION

## THAT BUILDS SATISFACTION

The entire construction trade—from contractor to the man who places the bars—has found it profitable to specify and use DIXISTEEL Concrete Reinforcing Bars... fabricated at the mill to exact specifications.

Basic bars are hot-rolled from high-quality steel. They are fabricated with the utmost precision, to save valuable time on the job.

Call us in on your next job and see why it pays to do business with DIXISTEEL.

● QUICK, ACCURATE ESTIMATES

● COMPETENT ENGINEERING AID—

DETAILING AND BILLS OF MATERIAL

● RAPID, DEPENDABLE SERVICE

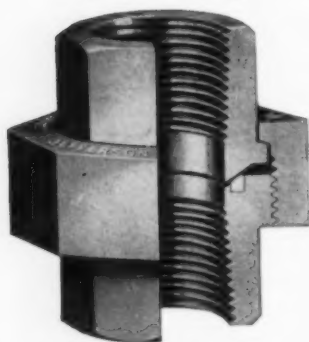
● COMPLETE, ADEQUATE STOCKS

Also headquarters  
for welded wire  
mesh and bar  
supports.

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**Atlantic Steel Company**

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# Specify



*Jefferson*

**A-4  
PIPE UNIONS**

**for  
low cost, leakproof  
performance**

Countless trials, tests and everyday use over many years and every kind of service have proved definitely that JEFFERSON UNIONS effect truly worthwhile savings in installation and maintenance costs. Experience shows that to specify "JEFFERSON" is to be assured of leakproof connections.

Reasons for outstanding performance can be summed up briefly as follows:

**Maximum Basic Strength** . . . through the use of air-refined malleable iron with an average basic strength of 55,000 lbs. P.S.I.

**Non-porous Seats** . . . through seat rings cut from specially drawn hard brass tubing and then ground not just finish-machined. (Iron-to-iron seats are also available.)

**Seats Integral with Body** . . . by press-fitting seat into machined channel, all possibility of rocking is eliminated.

**Maximum User Protection** . . . through careful air testing and rigid inspection.

**Can Replace Higher Cost Steel Unions** . . . approval by Underwriter's Laboratories for 500 lbs. P.S.I. steam and oil at 550°F, or 2,000 lbs. P.S.I. non-shock cold W.O.G. assures ability to recommend "JEFFERSONS" for services ordinarily calling for higher cost steel unions.

The complete Jefferson line includes 150#, 250# and 300# unions, union elbows, union tees and flange unions. Complete details on request.

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UNION CO.**

**45 FLETCHER AVE.  
LEXINGTON 73, MASS.**

The UNION that always insures leakproof service.

## News for the South & Southwest (Continued)

### Peerless Pump Specialist

Walter J. Blair has been appointed Process Pump Specialist for **Peerless Pump Division**, Food Machinery and Chemical Corporation. He will devote his time to pump application problems in refineries, chemical process and industrial plants, coordinating his efforts with the Peerless' field engineers and distributors.

### Southern Nitrogen Official

M. G. Woodward has been elected treasurer and assistant secretary of **Southern Nitrogen Company, Inc.** The new company is constructing a \$14,000,000 petro-chemicals plant in Savannah, Georgia, to start the production in early 1957 of 250 tons per day of nitrogen solutions for fertilizer use, and prilled ammonium nitrate.

### \$5 Million Extrusion Plant Underway at Richmond, Va.

Last month **Reynolds Metals Company** officials broke ground for a \$5,500,000 aluminum extrusion plant in Chesterfield County on its Bellwood property approximately 10 miles from Richmond, Va. The plant is expected to be in production by the third quarter of 1956.

It will be the most modern in the country and will supply the eastern market with aluminum extrusions used by manufacturers including architectural, building and transportation industries.

### ALCO Expansion—Texas

**Alco Products, Inc.** plans an expansion for its **Beaumont, Texas** plant, the former Beaumont Iron Works Company, amounting to over \$1½ million. The company has purchase more than two acres of land adjacent to its present property.

Plans call for construction of a combination warehouse-office building on the newly acquired land, plus

expansion of Alco's present manufacturing facilities.

To be completed in June of this year, the new warehouse will be used for the storage of various parts for Alco's new diesel-electric drilling rig power package, as well as the company's pipeline-pumping and auxiliary power diesel engines. In addition, oil-field drilling and production equipment and flanges, other rolled-steel products and the company's new Alcotwin fin-tube heat exchangers will be stocked in the building.

The building will include 14,000 sq ft of storage space plus 6,000 sq ft of office space and will consist of corrugated asbestos sides, a flat steel-deck insulated roof and a heavy-duty concrete floor. It will be furnished with the latest storage and materials handling equipment.

Expansion of the present Beaumont plant will include increased facilities for production of heavy-duty heat transfer equipment, as well as oil-drilling and production equipment. The plant expansion also is expected to be completed by June.

### American Air Filter—New Engine & Compressor Manager

George C. Rodgers has been named manager of the Engine and Compressor Department, **American Air Filter Company, Inc.** Rodgers succeeds the late Charles Sowerby who died last year.

In addition to his new duties, he will continue as manager of Military Products. He has been with the Herman Nelson Division of American Air Filter Company for the past five years. Prior to being named manager of Military Products, he was manager of Special Products.

### Western Precipitation Names Alford Chief Field Engineer

H. B. Alford has been promoted to Chief Field Engineer, responsible for all service, construction and inspection activities throughout the United States and Canada for **Western Precipitation Corporation**.



**National Power Show  
Nov. 26-30th in N.Y.C.**

In the two months following the announced return of the National Power Show to New York, after a four-year absence, nearly 200 leading companies have shown their keen interest by engaging exhibition space. Officially known as the **22nd National Exposition of Power and Mechanical Engineering**, the display is scheduled for November 26-30 under the auspices of The American Society of Mechanical Engineers, in conjunction with the Society's 76th annual meeting. As heretofore, it will be under the management of the International Exposition Company.

Displays will feature the newest equipment in the vast power field and mechanical engineering applications. An added attraction this year is an enlarged atomic power section, including displays by many pioneering companies. Supporting these tangible evidences of progress in nuclear engineering, will be the important technical sessions of the ASME Nuclear Engineering Division, as well as the National Industrial Conference Board's fifth annual "Atomic Energy in Industry" conference, which will be held at the same time.

The exposition will be held in the recently completed New York Coliseum, most modern exposition hall in America, whose mid-city location is readily accessible by all means of transportation.

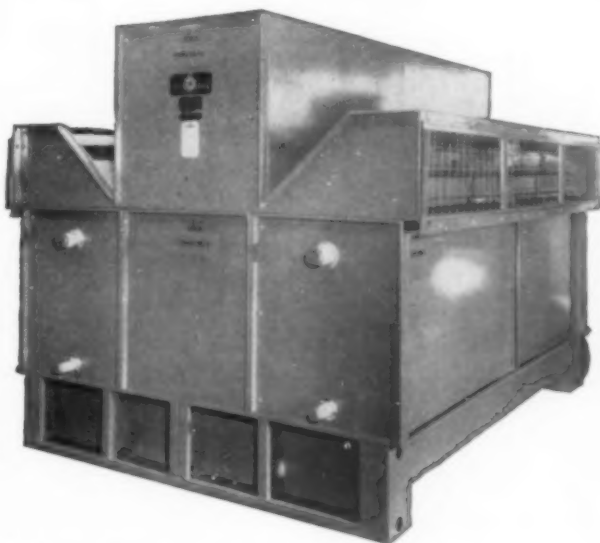
**Rayburn is Pocono S. M.**

Don H. Rayburn has been appointed to the newly created post of sales manager of **Pocono Fabricators, Inc.**, East Stroudsburg, Pa.

The firm manufactures Pre-Krete, a specially prepared formula for cement lining storage water heaters and tanks.

In his new position, Mr. Rayburn will take charge of Pocono Fabricators' stepped up sales program, which, according to a company spokesman, will include an expanded and improved marketing arrangement.

The firm is a division of the Patterson-Kelley Co., Inc., also of East Stroudsburg. The parent company manufactures a complete line of water storage heaters, instantaneous heaters, heat reclaiming and process equipment.



**NIAGARA SECTIONAL  
Aero HEAT EXCHANGER**

*gives close temperature control,  
saves you **LABOR**, Power, Water*

- Because the new design improves the heat transfer to the out-door air by evaporation.
- Because new features keep your equipment working for long life with "new plant" efficiency...always full capacity.
- Because you save 95% of cooling water cost.

You get faster, more accurate cooling of industrial fluids to specified temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

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ELECTRIC MOTORS

LOS ANGELES 22 • CHICAGO 35  
CINCINNATI 37 • NEW YORK 51

## News for the South & Southwest (Continued)

### Georgia Oil & Grease Absorbent Plant Has World's Richest Mineral Deposit



A new plant on a 3,000-acre site in southwest Georgia has been put into operation by **Waverly Petroleum Products Co.**, Philadelphia, to mine and process the mineral used in making oil and grease absorbents. These are applied on floors to absorb all types of liquids and prevent slipping.

The area chosen for the plant, which cost more than a quarter million dollars, is reported to have the richest deposits of the required mineral in the world. It is located at **Quality, Ga.**, about four miles from the town of Meigs. This location was selected after extensive research and geological surveys.

The new plant represents the company's first full-scale mining operation, and now gives Waverly complete control over both production and distribution. Only three other firms in the country mine, process and market nationally their own absorbents.

The plant was designed for easy expansion and fast materials handling by Raymond B. Ladoo, New-

ton, Mass., and J. T. Nash, Decatur, Ga., two of the nation's foremost authorities on non-metallic minerals.

The company is now producing its two main oil and grease absorbents, **Hi-Dri** and **Dri-Zit**, at the new mine. It plans later to produce variations of these two absorbents and additional materials for use in the chemical and petroleum industries.

All materials in the plant are handled automatically by the latest type of conveyor equipment. Dust is removed at every point of agitation to assure a dust-free product. The mineral is removed from the earth by selective, strip mining. Strict quality control is exercised.

Earth at the very beginning of the processing is separated according to quality grades. Samples from every storage bin are laboratory tested for proper volume weight, hardness, color and absorption.

**William R. Harris, Jr.**, Thomasville, Ga., a professional engineer and land surveyor, has been appointed **Plant Manager**.

### Cooper Alloy—Southeast

A stock-service agreement which will permit large stocks of **Cooper Alloy** stainless steel valves and fittings to be maintained at the Atlanta warehouses of **Reading, Pratt & Cady** has been made.

Under the new agreement **RP&C** will be charged with the responsi-

bility for building sales of **Cooper Alloy** stainless products through distributor outlets in the seven Southeastern states. An extensive reserve stock to back up distributor stocks will be maintained in Atlanta, thus speeding deliveries to all points in **North and South Carolina, Georgia, Florida, Tennessee, Alabama and Mississippi**.

### CP&L Management Changes

Three top-level promotions within **Carolina Power & Light Company**, Raleigh, N. C., have been announced.

Additional responsibility is being assigned to **H. B. Robinson**, vice-president who recently was named general manager. In addition to the operating and engineering department, Robinson will be responsible for three other departments. They are district operations, headed by Vice-President **J. C. Richert, Jr.**; personnel, directed by **M. T. Dunlap**; and right-of-way, managed by **Richard Seawell**.

**A. J. Skaale** was promoted to manager of the operating and engineering department. He also will report to Robinson.

**R. S. Talton**, production engineer, was promoted to superintendent of power, succeeding Skaale. Talton will be responsible for generating plants, system operations and communications.

### Bigelow-Liptak—Sthw.

Two new representatives have been added to the **Bigelow-Liptak** sales organization. The first, **Rex Bircket and Company** is located at 424 S. Cheyenne Street, Tulsa, Oklahoma. They will cover **Oklahoma** and the **Texas Panhandle**.

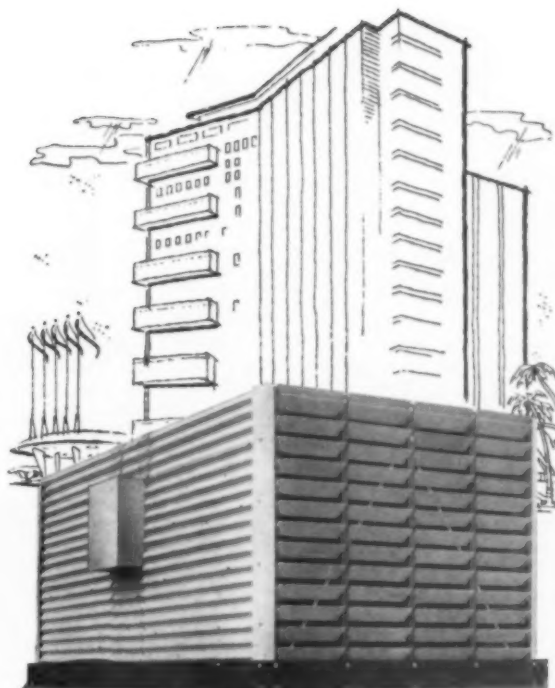
In addition, the **Sullivan-Mears Company** will represent Bigelow-Liptak throughout **Kansas and Western Missouri**. Their offices will be located at 4010 Washington Street, Kansas City, Missouri and 254 Laura, Wichita, Kansas.

Both companies will represent B-L in the sale of industrial furnace enclosures.

### Cash Standard—Mid-South

A new agent has been appointed for the **Cash Standard** line of automatic valves, controllers, governors and regulators. It will also represent the **Cash Standard Stacon Corp.**, a subsidiary of **A. W. Cash Co.**, Decatur, Ill., for temperature regulators.

Representing Cash Standard in the western two-thirds of **Tennessee** and northeastern quarter of **Arkansas** is **Hurston-Conaway, Inc.**, with main offices at 2470 Poplar Ave., Memphis and sub-offices at Nashville and Little Rock.



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high-performance cooling tower  
for major air conditioning installations.

This is the tower  
so distinguished in design,  
so conclusively proven in performance,  
that it has become the overwhelming favorite of  
architects, engineers, contractors and owners.

This, on a commercial or institutional scale

is water cooling

in a class by itself.



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Kansas City, Missouri



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### ★ Filters and Purifiers

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### ★ Modernized and Rebuilt Water Softeners

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### ★ Aerators and Degasitors

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## News (Continued)

### Pritchard—Oklahoma

The Ernest L. Graves Company, Tulsa, has been appointed sales representative in the state of Oklahoma by J. F. Pritchard and Co. of California, Kansas City, Missouri. Pritchard designs and manufactures cooling towers for air conditioning and industrial applications and Hydriers, packaged dehydration units for the drying of air and other gases



Ernest L. Graves

Ernest L. Graves' experience includes four and one-half years as Mechanical Engineer for Shell Pipe Line Corporation; one year as Section Head Engineer for Standard Oil Company of Indiana, Products Pipe Line Department, and seven years sales experience, the last two of which were spent as sales manager, for a manufacturer's representative in Tulsa, Oklahoma.

### Alcoa Promotes

John D. Harper

Aluminum Company of America has named John D. Harper as general manager of the smelting division.

Mr. Harper joined Alcoa in 1933 after part time employment at the company's Alcoa, Tenn., works during his school years. In 1943, after several power department assignments, he became assistant district power manager.

In 1951 he was named works manager of the company's new Rockdale, Texas, smelter and guided first primary aluminum production at that location.

### Mason-Neilan Now Worthington Division

Worthington Corporation and the Mason-Neilan Regulator Company of Boston, Massachusetts have effected an agreement for the transfer of the net assets, name and goodwill of Mason-Neilan to Worthington in exchange for Worthington common stock.

The Mason-Neilan plant and facilities now are operated as the Mason-Neilan Division of Worthington, and the entire working force and management staff continue in their present positions.

The merger unites two leading manufacturers in complementary fields. Mason-Neilan control valves and regulators, in conjunction with Worthington pumps, compressors, turbines and other types of industrial machinery produced by Worthington, are effectively used in automatically controlled production systems.

The full line of Mason-Neilan products will continue to be manufactured, including instruments and valves designed to control the pressure, temperature and flow of the liquids, gases and components incident to industrial processes. Among them are indicating, controlling and recording instruments, flow meters, diaphragm control valves, servomotors, pressure regulators, pump governors, filters and other specialties.

### Fort Worth Steel Expanding

Dave Hoke has been appointed industrial engineer of Fort Worth Steel & Machinery Company, Fort Worth, Texas.

His initial task in the new post is planning re-arrangement of the company's Fort Worth plant, as part of a major program underway to expand the company's production capacity. FWS&M manufactures and distributes nationally a wide variety of mechanical power - transmission equipment, bulk-materials-handling equipment and specialized machinery for industrial use.

Before joining FWS&M, Hoke was an industrial engineer at Convair's Fort Worth plant for five years. A native of Memphis, he was graduated from the University of Tennessee in December, 1950, receiving the degree of bachelor of science in industrial management. He is a member of the American Institute of Industrial Engineers.



## News (Continued)

### Pemco Works Mgr.—Md.

Richard H. Turk, 3rd has been appointed Works Manager for **Pemco Corporation, Baltimore, Maryland.** As Works Manager, Mr. Turk will have complete charge of all manufacturing, shipping, receiving, control, plant engineering and planning for the Corporation, which produces ceramic coating materials.

Mr. Turk was Assistant Works Manager for two years prior to assuming his present position. During the Korean War he was engaged in making incendiaries for military use at Pemco, and before that was Manager of the company's Pottery Arts Division.

### Stock Equipment—Carolinas

**Brown and Morrison** Manufacturers Representatives of 207 Liberty Life Building, **Charlotte 2, North Carolina,** are representing **Stock Equipment Company** in the Carolinas. Stock Equipment, with headquarters in Cleveland, Ohio, are specialists in bunker to pulverizer and bunker stoker equipment.

Principals of the Brown and Morrison organization are **W. C. Morrison, H. K. Couch,** and **D. H. Jones.** The company also represents **Diamond Power Specialty Corporation, Milton-Roy Company, Cochrane Corporation,** and **Coppus Engineering Corporation.**

### C & B Distributor for Bay State Tap and Die

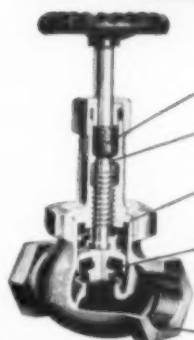
**The Cameron & Barkley Company,** Southeastern distributor of industrial supplies, with branches at **Charleston, S. C., Savannah, Ga., and Jacksonville, Tampa, Orlando, and Miami, Florida,** has been named distributor for **Bay State Tap and Die Company** of Mansfield, Mass.

C & B will carry a complete line of standard taps, dies, and screw plates made by the 50 - year - old Massachusetts concern. A complete engineering service for those with difficult or unusual threading problems is also offered by Bay State.

## New Standard for the Industry

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underwriters approved  
LP-Gas Valves



- Tight**—deep stuffing box filled with special reinforced packing for LPG service — treated with proper lubricants and surface graphited for minimum stem friction.
- Tight**—protected top seat above threads out of line of flow permits repacking of stuffing box when valve is wide open and under pressure.
- Tight**—Fairbanks radial seat of two piece union bonnet. Machined to a true ball and socket joint, assures a leak-proof body bonnet joint and rigid alignment of the working parts of the valve.
- Tight**—Fairbanks  $\pm 60$  Special Synthetic Disc, Underwriters approved for use with butane or propane in the liquid or gaseous state, combines toughness and resilience through temperature range of  $-50^{\circ}$  to  $150^{\circ}$  F. for positive sealing in gas service. Disc Replacement easily and quickly accomplished with Fairbanks Slip-On Holder.

#### Service Recommendations:

These valves are recommended for all common commercial forms of liquefied petroleum (butane-propane) gases whether handled in liquid or gaseous state. They are designed for application on all types of piping systems for storing, transporting and utilizing these gases, and demonstrate excellent efficiency on hot or cold water, compressed air, gasoline, light oils, volatile fluids, and other services operating within their pressure and temperature ratings.

**Gate Valves** — with metal to metal seat are approved by the Underwriters for use only in branch or by-pass lines where positive shut-off is not essential.

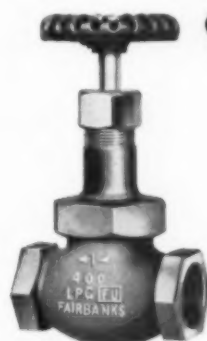


FIG. 1101—Globe  
Sizes  $\frac{1}{2}$ "—2"



FIG. 1102—Angle  
Sizes  $\frac{1}{2}$ "—2"

### FAIRBANKS

#### Working Pressures

Oil or Gas 400 lbs.,  $150^{\circ}$  F. max. temp.  
Water 400 lbs.,  $200^{\circ}$  F. max. temp.  
UL Approved for LP-Gas up to 250 lbs.



FIG. 1109-A—Check  
1109—Check—Spring Loaded  
Sizes  $\frac{1}{2}$ "—2"



FIG. 1106—Gate  
Sizes  $\frac{1}{2}$ "—2"

DART & Pic Unions

The **FAIRBANKS** Company

## News (Continued)

### Baker-Raulang—Dallas

Norman F. Burdette has been named manager of a newly-established branch office of the **Baker-Raulang Company** in Dallas, Texas. Located at 1822 Young Street in Dallas, the branch will handle sales of Baker's complete line of gasoline, electric and LPG fork lift trucks, crane trucks, platform trucks, the Shovel loader front-end loader, and the Travel loader side-loading fork truck, in **Dallas and North Texas**. The branch will maintain a complete stock of parts and will be equipped for all service operations.

### \$8 Million G.E. Lighting Plant in Operation—N. C.

Just one year after breaking ground for the new home of its

Outdoor Lighting Department in **Hendersonville, N. C.**, the **General Electric Company** announced shipment of the first street lighting luminaires from the nearly-completed \$8,000,000 plant. More than 700 people are expected to be employed by the department when it achieves full production.

The department's new 228,000 sq ft home was designed by the J. E. Sirrine Company of Greenville, S. C. A two-story, air-conditioned office building of approximately 33,000 sq ft fronts a 184,000 sq ft manufacturing area, and a modern testing laboratory of roughly 11,000 sq ft. A 60-acre plant site allows adequate space for future expansion.

The plant, which is expected to operate on a three-shift, 24-hour basis, will be floodlighted by night.

Construction is now underway on full-scale demonstration streets designed to show the value of various types of fluorescent, mercury, and incandescent street lighting luminaires. Provisions will be made to demonstrate the effectiveness of the department's products in a wide variety of applications.

### L. J. Wing—Md. & Ala.

Three sales representatives for **L. J. Wing Mfg. Co.**'s line of revolving unit heaters, fans, blowers, draft inducers and steam turbines include:

**Power and Combustion, Inc.**, 219 E. 25th Street, Baltimore, in much of the state of **Maryland**; **The Gulf-South Engineering Co.**, 2815 South 18th Street, Birmingham, Alabama, in **Northern and Central Alabama**; and **Bell and Company**, 307 North Royal Street, Mobile, Alabama in **Southern Alabama**.

### Enterprise Engine Appoints Tulsa District Manager

**Stephen Reed** has been named Tulsa District Sales Manager for **Enterprise Engine & Machinery Co.** His territory covers **Arkansas, Oklahoma, and the Texas Panhandle**, particularly including service to diesel engine requirements of the petroleum industry. The Enterprise district office in Tulsa is at The Hotel Mayo.



### Better moisture resistance in rubber power cable!

Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture than industry standards permit. Result: longer cable life, greater freedom from failure for users where rubber-type cable is installed in underground ducts or buried directly in earth. New Engineering Bulletin EB-27 gives full details on performance of Anaconda Type AB insulation in 15 Industry Specification Tests. Write for your free copy. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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PARTS  
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## Books for the Plant Engineer

### Electro-Magnetic Machines

By **R. Langlois-Berthelot**; Published by **Philosophical Library, Inc.**, 15 E. 40th St., New York 16, N. Y.; 535 pages; Price \$15.00

This book was first published in France. The author is the Chief Research Engineer for Production and Transformer Equipment at "L'Elec-tricite de France." The high voltage laboratory which he directs is one of the most modern and best equipped in Europe. It is believed by the publisher that this book will establish itself as a standard work for the subject of electro-magnetic machines. It relates the various kinds of electrical machines to each other, recognizing them as being of one family having a common basis of existence. Fundamental principles that remain, rather than practice that frequently changes, are in the text of this book firmly established.

### Industrial Chemistry

By **Geoffrey Martin**; Published by **Philosophical Library, Inc.**, 15 E. 40th St., New York 16, N. Y.; 3 volumes; Price \$50.00

This group of three volumes covers organic chemistry in the seventh edition, and parts 1 and 2 of inorganic chemistry in their sixth edition.

The single volume on organic chemistry contains 752 pages, and the two volumes on inorganic chemistry contain the total of 1,091 pages. All of these volumes have been brought up to date in their latest editions.

The continued demand for Martin's "Industrial Chemistry" over the past twenty years has resulted in the publication of this new edition. In order for the current editor to do his job satisfactorily, all out-of-date matter has been replaced, but the older material relating to the technical development of processes or industries has been retained.

Many sections have been completely rewritten, and new material has been included to indicate latest developments in the various subjects. Collaborators in the new edition have been selected because of specialized knowledge of the subject of the sections they have revised.

### Industrial Furnaces, Volume II

By **W. Trinks**; Published by **John Wiley & Sons, Inc.**, 440 Fourth Avenue, New York 16, N. Y.; 359 pages; Price \$10.00

This is the third edition of a widely successful work by W. Trinks. It brings the book up to date on advances in the field since 1941.

It discusses and describes practically everything needed for efficient furnace operation. The general arrangement of the previous edition has been retained, but important changes have been made within each chapter.

### Handbook of Engineering Materials

Prepared by **Douglas F. Minor** and **John B. Seastone**; Published by **John Wiley & Sons, Inc.**, 440 Fourth Avenue, New York 16, N. Y.; Price \$17.50

This handbook of engineering material has been planned to give maximum help to the engineer in any field—whether he is concerned with the extraction or preparation of raw

products, with the design of manufacturing and consumer equipment or with the operation and maintenance of a plant.

It achieves its aim because of its scope and because every aspect of the book is based on close observation and understanding of the process followed by the engineer in selecting materials for given functions. The emphasis is on the principal factors considered in such a selection — properties, adaptability to fabricating methods, availability, and cost. Its 1,400 pages are packed with accessible data on these aspects of all the unusual engineering materials.

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For insertion into pipe

FOR EVERY APPLICATION

BRONZE, IRON, STEEL,  
STAINLESS STEEL



FIG. 29  
Cylinder with  
Impeller



FIG. 17-28  
Cylinder



FIG. 215  
Flanged



FIG. E-57  
Double  
Window



FIG. 212  
Visibility  
Welding  
Neck or  
Screw



FIG. E-811  
Flapper



FIG. E-1810  
Rotating Wheel Type

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## Plant Maintenance Ideas & Methods

For Free Information — Circle Code No. on page 17 or 18

### Q-1 Relay Maintenance

Data sheets 156UB discuss the "Why and How of Protective Relay Maintenance" and highlight test equipment necessary, test records and test location. Tables and hook-up schematics show how one typical high current test instrument is used for achieving test results under conditions that closely simulate actual overload values. — MULTI-AMP CORPORATION, 10 Third St., Newark, N. J.

### Q-2 Dry Out Motors

Bulletin shows how it takes only a few minutes for Spradri to reactivate and rust-proof electrical equipment which has been shorted out by moisture or water. Equipment need not be dismantled because Spradri's fine mist reaches every crevice. Protects against future shorting out for long periods. Available in Aerosol cans. — SPRADRI COMPANY, Div. of Perfecting Service Co., 334 Atand Ave., Charlotte 6, N. C.

### Q-3 Powder-Actuated Fastening System

8 page bulletin B105 describes the Ramset System for fastening into concrete or steel. Sets threaded studs (or nail-like pins) into concrete or steel for attaching construction materials. Reduces cost; reduces fatigue; and provides a superior anchor. Light, medium and heavy duty models available. — RAMSET FASTENERS, INC., 12117 Berea Road, Cleveland 11, Ohio.

### Q-4 Portable Ventilating Duct

Bulletin 40 covers Flexaust hose and Portovent duct for moving air, dust, fumes, gases and materials via pressure, suction and gravity. Many applications in plant maintenance work. — THE FLEXAUST COMPANY, 100 Park Avenue, New York 17, New York.

### Q-5 Woven Wire Slings

20 page catalog shows how Gripper woven wire slings boost efficiency and safety in materials handling. Long life reduces maintenance cost. Features construction data and 12 typical case studies. — CAMBRIDGE WIRE CLOTH COMPANY, Cambridge, Md.

### Q-6 Floor Maintenance Machine

8 page catalog gives useful buying facts; how to select a machine to fit the job; and attachments — all purpose utility polisher-scrubber and a line of commercial type vacuums for wet or dry pick-up. — THE AMERICAN FLOOR SURFACING MACHINE CO., Toledo 3, Ohio.

### Q-7 Floor Surfacing Product

Bulletin No. 200 describes Plastic Rock, a floor surfacing compound composed of aggregate, asphaltic paste and a setting powder. When combined with water these ingredients form a mortar-like mixture which is troweled over the old surface. Can be used over concrete, wood or steel. — UNITED LABORATORIES, INC., 16801 Euclid Avenue, Cleveland 12, Ohio.

### Q-8 Check Valve

Bulletin describes a basic check unit for everyday plant maintenance problems. Units, the complete working parts of a check valve, eliminate the necessity of purchasing the usual check valve "body." When added to any standard fitting (such as a reducing coupling) gives a complete check valve suitable for any purpose. — DURABLA MANUFACTURING COMPANY, 114 Liberty St., New York 6, New York.

### Q-9 Flange Spreader

Bulletin describes a fool-proof, slip-proof tool which always holds unmolded

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It has been done . . . is being done right now. Intermittent, hit-or-miss boiler blow-off is a "make-shift" at best and results in a shameful waste of heat energy and money. The Madden method of continuous blow-down saves that money—not always at the rate of a 1000% return, but enough certainly to pay its way in a few months. If this sounds good to you, write for "Blow-down Savings" to The Madden Corp., 1543 W. Morse Ave., Chicago 26, Ill.



flanges in alignment. Applicable for removing blanks and changing gaskets in a pipe line. Can be used safely and quickly even in cramped spaces. Speeds up labor on the job. — FRANK GROVES COMPANY, 444 Brannan Street, San Francisco 7, California.

#### Q-10 Flue Gas Analyzer

Bulletin describes the Model P4 Portable Flue Gas Analyzer for measuring CO<sub>2</sub> in flue gas. Shows how it works, saves maintenance man-hours, etc. — THERMCO LABORATORIES, Michigan City, Indiana.

#### Q-11 Solvent Detergents

Bulletin describes cleaning materials that combine the oil and carbon dissolving abilities of solvent with the penetrating wetting-out and water-rinsing qualities of surface acting agents. Applicable for cleaning electrical equipment, for removing zinc primers and organic finishes from aluminum, and for removing carbon, paint and soil. — OAKITE PRODUCTS, INC., 19 Rector St., New York 6, New York.

#### Q-12 Storing Coated Abrasives

Bulletin "How to Store Coated Abrasives" cover sheets, rolls, belts and discs. The conditions under which they are stored may effect the subsequent performance of a material when used. — ARMOUR AND COMPANY, Coated Abrasives Division, Alliance, Ohio.

#### Q-13 Weed Killers

Bulletin A-995 shows how "Telvar" weed killers work. Gives general information, equipment, and how and when to use. — E. I. du PONT de NEMOURS & CO. INC., Grasselli Chemicals Dept. Wilmington 98, Del.

#### Q-14 Lifting Jacks

40 page catalog 204 covers ratchet, screw, air motor, hydraulic, air hydraulic and special jacks for manufacturing and utility plants. Special sections on "How to Select the Right Jack" and on "Maintenance and Safety." — DUFF-NORTON COMPANY, Pittsburgh 30, Pennsylvania.

#### Q-15 Pre-Mixed Mortar

4 page folder describes the Embecco Pre-Mixed Mortar for non-shrink, watertight repairs to concrete floors, walls and masonry. Correct procedures for 12 different mortar applications are illustrated. — THE MASTER BUILDERS CO., 7016 Euclid Avenue, Cleveland 3, Ohio.

#### Q-16 Caulking & Glazing

Folder describes the DEL Synthetic Rubber Caulking and Glazing Compound that can be applied to any surface, hole or joint and overnight sets-up into a permanent flexible solid rubber. Can be applied by caulking gun, trowel or knife and bonds to glass, brick, metal, concrete, wood, transite, etc. — DAVID E. LONG CORP., 220 East 42nd Street, New York 17, New York.

#### Q-17 Cast Iron Repairs

4 page booklet "The Repair of Cast Iron Parts" outlines latest information on welding of cast iron with Ni-Rod and Ni-Rod "55". 9 case histories are featured. — THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, New York.

#### Q-18 Pipeline Identification

12 x 17 chart, which may be posted in the shop gives information on pipeline identification by color as recommended by the American Standards Association and information on the Uniform Color Code for Safety. Pipeline Identification system assigns materials to five classes — safe, dangerous, protective, valuable, fire protective. — THE ARCO COMPANY, 7301 Bessemer Avenue, Cleveland 27, Ohio.

#### Q-19 Corrosion Proofing

8 page illustrated booklet gives information on cement mortars, interliners for masonry construction and protective coating and linings for surface treatment. Installations surveyed include linings in acid concentrators, stacks, pickling tanks, brick and tile floors as well as sumps, pits and trenches for handling industrial wastes. — PENNSYLVANIA SALT MFG. CO., Three Penn Center Plaza, Philadelphia 2, Pa.

#### Q-20 Welding Stainless Steel

Folder TDC-162A discusses welding characteristics of both austenitic and ferritic types of stainless steel and describes various welding methods and techniques. Table indicates electrodes, preheating and postwelding heat treatment to be used. — TUBULAR PRODUCTS DIVISION, The Babcock & Wilcox Company, Beaver Falls, Pennsylvania.

#### Q-21 Vibration & Noise Control

Bulletin K6A is a plant engineer's guide to machinery mounting, vibration control and noise control. Solves problems of installing machinery and other equipment. — THE KORFUND CO. INC., 4832 Place, Long Island City, New York.

#### Q-22 Power Sweepers

4 page folder describes models 605 and 606, newly designed sweepers capable of sweeping up to 100,000 or more square feet per hour in open areas. Feature the "Filter-Vac" Dust Control which eliminates the usual dust bag. — WAYNE MANUFACTURING CO., 1201 East Lexington Avenue, Pomona, California.

#### Q-23 Combustible Gas Indicators

Bulletin 0804-2 describes a new line of indicators for locating gas leaks, for testing questionable atmospheres, differentiating between combustible gases and vapors and for measuring health hazards. — MINE SAFETY APPLIANCES COMPANY, 201 N. Braddock Avenue, Pittsburgh 8, Pa.

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**Q-24 Cleanable Filter**

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**Q-25 Water Line Vibration**

Catalog SZ-55 describes "Soundzorber," a wire-reinforced rubber pipe for eliminating noise and vibration from a water line. Sizes range from ½" ID to 12". Temperature range up to 180 F for cold water, brine and hot water lines. Pressure range up to 250 psi. — INDUSTRIAL DIVISION, T. R. FINN & COMPANY, 200 Central Avenue, Hawthorne, New Jersey.

**Q-26 Structural Fittings**

12 page catalog describes No-Thread, No-Weld, Key-Lok Fittings which may be used with any pipe to build storage racks, railings, maintenance stands and similar structures. Pipe and fittings can be used over and over again. — NATIONAL INDUSTRIAL SUPPLIES CO., 4 S. Main St., Dayton 2, Ohio.

**Q-27 Hot Spray Heater for  
Outdoor Maintenance**

Data sheets describe the Spee-Flo Hot Spray Portable 600, a heavy duty field unit designed to operate in chemical plants, oil fields, refineries, shipyards, steel mills and wherever protective coatings are applied. Brings advantages of heated application into outdoor maintenance work for use with all types of sprayable coatings. — THE SPEE-FLO COMPANY, 720 Polk Avenue, Houston, Tex.

**Q-28 Leather Belting**

Booklet describes comprehensively the selection, installation, and proper maintenance of modern leather belting. — ATLANTA BELTING CO., 508-510 Whitehall St., S. W., Atlanta, Ga.

For More Free Data CIRCLE CODE NO.  
on the Handy Return Card — Page 17

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2 \_\_\_\_\_

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Company \_\_\_\_\_

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BULLETIN 143



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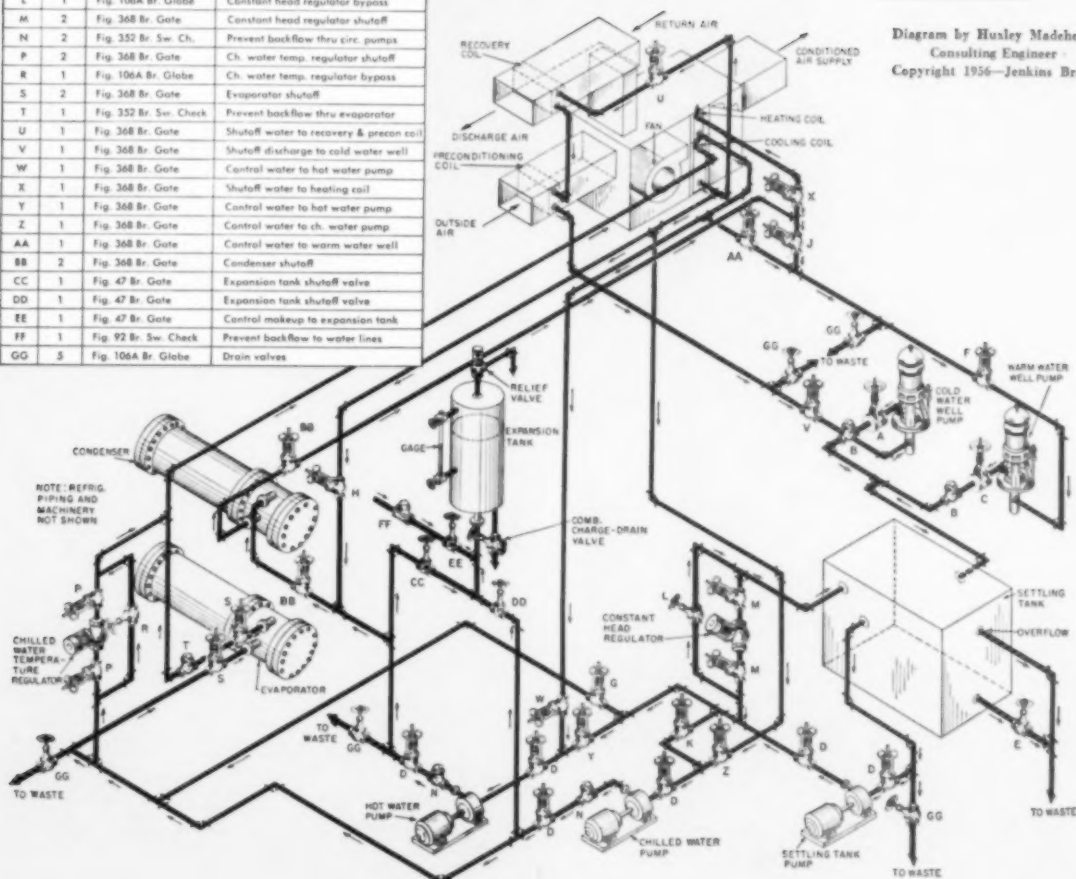
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# JENKINS PRACTICAL PIPING LAYOUTS

# 77

Code	Quan.	Jenkins Valve	Service
A	1	Fig. 677A Br. Gate	Cold water well shutoff valve
B	2	Fig. 295 Br. Sw. Check	Prevent backflow thru well pumps
C	1	Fig. 677A Br. Gate	Warm water well shutoff valve
D	6	Fig. 368 Br. Gate	Circ. pump shutoff valves
E	1	Fig. 106A Br. Globe	Settling tank drain valve
F	1	Fig. 368 Br. Gate	Shutoff discharge to warm water well
G	1	Fig. 368 Br. Gate	Control water to evaporator
H	1	Fig. 368 Br. Gate	Control water to condenser
J	1	Fig. 368 Br. Gate	Control water to warm water well
K	1	Fig. 368 Br. Gate	Control water to ch. water pump
L	1	Fig. 106A Br. Globe	Constant head regulator bypass
M	2	Fig. 368 Br. Gate	Constant head regulator shutoff
N	2	Fig. 352 Br. Sw. Ch.	Prevent backflow thru circ. pumps
P	2	Fig. 368 Br. Gate	Ch. water temp. regulator shutoff
R	1	Fig. 106A Br. Globe	Ch. water temp. regulator bypass
S	2	Fig. 368 Br. Gate	Evaporator shutoff
T	1	Fig. 352 Br. Sw. Check	Prevent backflow thru evaporator
U	1	Fig. 368 Br. Gate	Shutoff water to recovery & precond coil
V	1	Fig. 368 Br. Gate	Shutoff discharge to cold water well
W	1	Fig. 368 Br. Gate	Control water to hot water pump
X	1	Fig. 368 Br. Gate	Shutoff water to heating coil
Y	1	Fig. 368 Br. Gate	Control water to hot water pump
Z	1	Fig. 368 Br. Gate	Control water to ch. water pump
AA	1	Fig. 368 Br. Gate	Control water to warm water well
BB	2	Fig. 368 Br. Gate	Condenser shutoff
CC	1	Fig. 47 Br. Gate	Expansion tank shutoff valve
DD	1	Fig. 47 Br. Gate	Expansion tank shutoff valve
EE	1	Fig. 47 Br. Gate	Control makeup to water lines
FF	1	Fig. 92 Br. Sw. Check	Prevent backflow to water lines
GG	5	Fig. 106A Br. Globe	Drain valves

Diagram by Husley Madeheim  
Consulting Engineer  
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## How to plan piping connections for all-year

### AIR CONDITIONING WITH THE HEAT PUMP

**Well water is used** in the basic heat pump installation illustrated. Such a system could readily serve a building with several exterior and interior zones, which would have many air handling units. For simplicity, only one unit is shown in the diagram.

**For heating demands,** this system provides a closed circuit consisting of hot water pump, condenser, and heating coil. For cooling, a second closed circuit consists of chilled water pump, evaporator, and cooling coil.

**During the heating season,** water is supplied to the settling tank from the warm water well (about 60° F). It is circulated

by the chilled water pump to the evaporator, and then to the cooling coil to provide cooling, where needed, for interior areas. The water then flows to the recovery coil, picks up heat from waste air and carries it to preconditioning coil, where it is used to preheat outside air. The resulting chilled water is discharged to the cold water well.

**During the intermediate seasons,** water is supplied to the settling tank from the cold water well (about 50° F). It is circulated by the hot water pump to the condenser, and then to the heating coil to provide heat, where needed, for the exterior zones. The water is then discharged to the hot water well.

**During the cooling season,** water from the cold water well is pumped to the settling tank, and then circulated to the evaporator and the cooling coils. It is next used to cool the condenser, and is then discharged to the hot water well. If the demand for cooling is low, and the well water cold enough, the evaporator may be bypassed.

Consultation with accredited piping engineers and contractors is recommended when planning major piping installations.

**Enlarged diagram** and full description of this layout free on request. Ask for Layout No. 77. Jenkins Bros., 100 Park Ave., New York 17.

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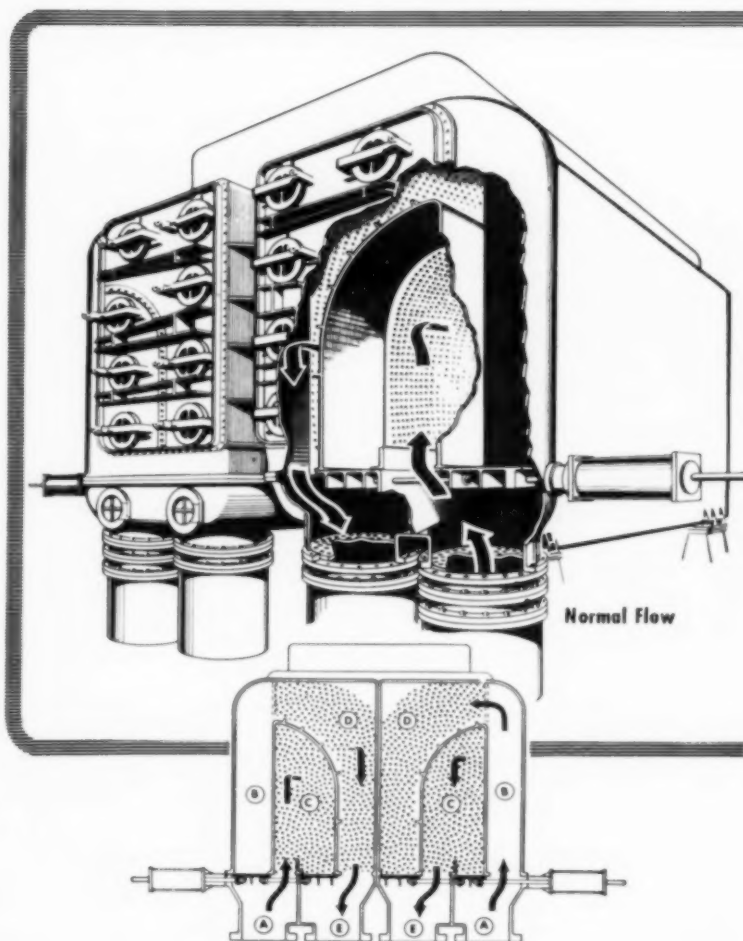
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When debris and organic growth collect on the tube sheets of a C. H. Wheeler Patented Reverse Flow Steam Condenser, you don't have to shut it down for cleaning. It cleans itself—without loss of load. Sluice gates arranged within the condenser may be controlled, either electrically or hydraulically, to reverse the flow of cooling water through the tubes. This sudden reverse flow literally flushes away leaves and debris, dislodges crustaceous matter from clogged tubes.

Because of 100% water flow during back flushing, there is only a negligible dip in vacuum momentarily, thus permitting continuous load on the turbine. The Reverse Flow Condenser cleans itself in minutes, compared with hours of downtime when tube sheets are manually cleaned. A typical report shows a half-inch loss of vacuum (due to fouled tubes and tube sheets) was restored in five minutes after reversing the flow of cooling water. Often, a C. H. Wheeler Reverse Flow Condenser goes two years or more without shut down for cleaning, depending on the condition of the cooling water.

New, exclusive deaerating features and construction techniques help make C. H. Wheeler Steam Condensers "First in Efficiency." Let C. H. Wheeler Custom Engineer your next steam condenser. Phone or write C. H. Wheeler Manufacturing Co., 19th & Lehigh, Philadelphia 32, Pa. . . Manufacturers of Steam Power Plant Condensers • Vacuum Equipment • Marine Auxiliary Machinery • Water Supply, Drainage and Circulating Pumps.



HOW "REVERSE FLOW" WORKS

### Left Side Shows Normal Operation

Water enters inlet A with right port open. Flows through tube bank C to rear of condenser . . . returns through tube bank D to front of condenser and discharges at E.

### Right Side Shows Reverse Flow

Sluice gates move on a common stem. Water flows up through channel B, and through tube bank D to rear of condenser . . . returns through tube bank C to front of condenser.

In the C. H. Wheeler Divided Water Box Design, each half of the condenser can be back-flushed independently.

WE603

# C. H. Wheeler

OF PHILADELPHIA

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